The Harman Kardon Model CD301

Manual No. 38A

ULTRAWIDEBAND LINEAR PHASE CASSETTE DECK

Technical Manual

CD301

harman/kardon

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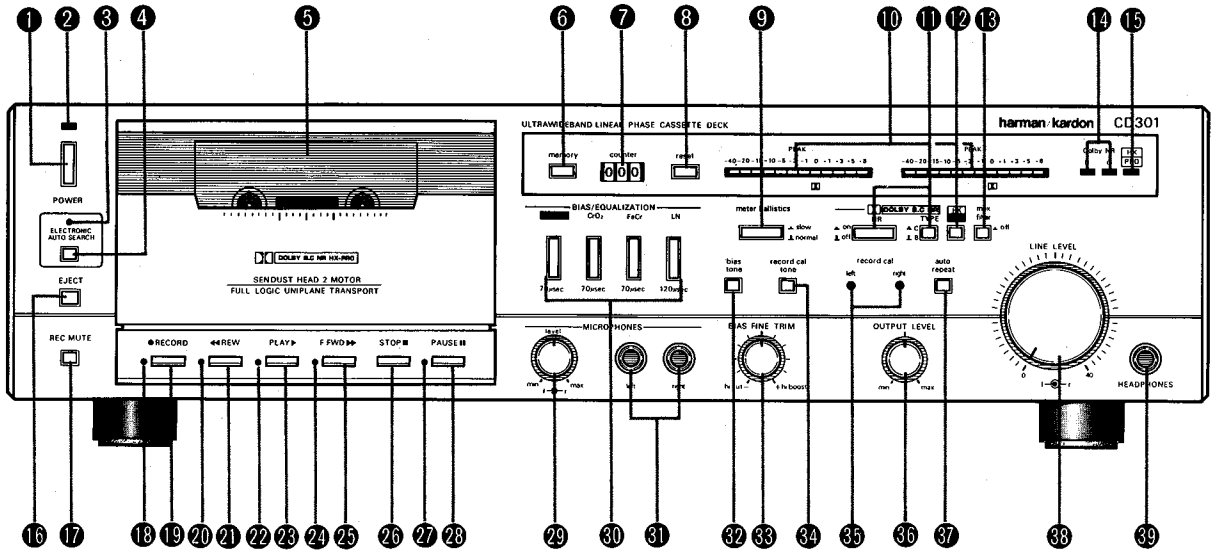
COMPONENTS AND THEIR FUNCTIONS



❶ POWER SWITCH (POWER)
For power turning on and off.
When this switch is pressed with the AC cord plugged to an AC outlet, the POWER INDICATOR illuminates.

❷ POWER INDICATOR
For indication of power supply to this unit.

❸ ELECTRONIC AUTO SEARCH INDICATOR
For indication of functioning of the electronic auto search system.

❹ ELECTRONIC AUTO SEARCH SWITCH (ELECTRONIC AUTO SEARCH)
For quick cueing of the start of a music.
When this switch is depressed, the ELECTRONIC AUTO SEARCH INDICATOR illuminates and a start of each music is automatically searched so as to enable sequential playback of the musics recorded in a tape.

❺ CASSETTE COMPARTMENT

❻ MEMORY BUTTON (memory)
For automatic stopping of tape rewinding at a desired position in combination with the RESET button.
Depress this button and push the RESET button during playback or recording to reset the TAPE COUNTER to "000".
When the tape is rewound in this state, tape running automatically stops at the position where the TAPE COUNTER indicates "000".

❼ TAPE COUNTER (counter)
For digital display of the position in a cassette tape.
The figure changes as the tape runs. Cueing for the start of a melody is facilitated by making a note of the counter reading.

❽ RESET BUTTON (reset)
For resetting the TAPE COUNTER to "000". Press this button to reset the counter to "000" when starting recording. This button is also used with the MEMORY button to stop tape rewinding automatically at the desired position.

❾ METER BALLISTICS SELECTOR (meter ballistics)
For selection between normal and slow LED LEVEL DISPLAY recovery time.

❿ LED LEVEL DISPLAY (PEAK)
For clear indication of the recording or playback level.

⓫ DOLBY NR SYSTEM SELECTOR (DOLBY BC NR)

- **NR ON/OFF SELECTOR (NR)**
  For recording or playback using the Dolby NR system.
  Press this selector to use the Dolby NR system. The green DOLBY NR INDICATOR (for B-type) or the yellow one (for C-type) illuminates according to the NR TYPE selector position. Press this selector again to invalidate the Dolby NR system.
- **NR TYPE SELECTOR (TYPE)**
  For selection of Dolby B- or C-type NR system.
  Depress this selector to select the Dolby C-type NR system. Press it again and the B-type is selected.

⑫ **HX-PRO SWITCH (HX-PRO)**
Press the switch when recording in HX-PRO system. See HX-PRO System for details.

⑬ **MPX FILTER SWITCH (mpx filter)**
For cutting the multiplex noise during recording of an FM stereo broadcasting program by using the Dolby NR system.
Depress this switch to invalidate the MPX filter function.

⑭ **DOLBY NR INDICATORS (Dolby NR B, C)**
For indication of the validated Dolby NR system type.

⑮ **HX-PRO INDICATOR (HX-PRO)**
For indication that recording is in progress using HX-PRO system.

⑯ **EJECT BUTTON (EJECT)**
For opening the CASSETTE COMPARTMENT door.
The soft eject mechanism opens the door slowly when this button is pressed.

Caution: Never press this button while tape running. Be sure to press the STOP button before pressing the EJECT button.

⑰ **RECORD MUTE BUTTON (REC MUTE)**
For providing a soundless interval during recording.
To cut off undesirable sound between melodies, keep this button pressed until the next melody starts. No sound is recorded as long as this button is kept pressed.

⑱ **RECORD INDICATOR**
For indication of recording state.

⑲ **RECORD BUTTON (● RECORD)**
For recording on a tape.
Press this button after pressing the PAUSE button to provide standby state for recording. The RECORD INDICATOR blinks and the PAUSE and PLAY INDICATORS illuminate. Recording starts when the PAUSE button is pressed again. The RECORD INDICATOR goes to continuous illumination and the PAUSE INDICATOR extinguishes.

⑳ **REWIND INDICATOR**
For indication of tape rewinding.

㉑ **REWIND BUTTON (◀◀ REW)**
For rewinding of a tape at a high speed.

㉒ **PLAY INDICATOR**
For indication of tape playback.

㉓ **PLAY BUTTON (PLAY ▶)**
For playback of a tape.
Press this button to start playback.

㉔ **FAST FORWARD INDICATOR**
For indication of fast forwarding of a tape.

㉕ **FAST FORWARD BUTTON (F. FWD ▶▶)**
For fast forwarding of a tape.

㉖ **STOP BUTTON (STOP ■)**
For stopping each operation.
Pressing this button stops playback, recording, fast forwarding or rewinding of a tape. It also cancels standby state by PAUSE button operation.

㉗ **PAUSE INDICATOR**
For indication of pause state.

㉘ **PAUSE BUTTON (PAUSE ❚❚)**
For temporary stopping of playback or recording.
Also press this button to provide standby state for playback or recording. With this button pressed, both the PAUSE and the PLAY INDICATORS turn on at the same time. Then to start playback, press the PAUSE button again or to start recording, press the RECORD button first and the PAUSE button.

㉙ **MICROPHONE INPUT LEVEL CONTROLS (MICROPHONES-level)**
For input level control during recording through microphones.
The front side knob is for the left channel and the rear one is for the right channel.
The knobs turn simultaneously when turned normally.

㉚ **TAPE SELECTORS (BIAS/EQUALIZATION)**
For selection of metal, CrO_2, FeCr or LN position according to the type of the tape to be used.

㉛ **MICROPHONE JACKS (MICROPHONES)**
For connection of recording microphones.
Use low-impedance microphones.

㉜ **BIAS TONE BUTTON (bias tone)**
For setting of optimal bias for each tape.
While this switch is kept pressed, 400 Hz signal is recorded in the left channel, and 12.5 kHz in the right channel.

㉝ **BIAS FINE TRIM KNOB (BIAS FINE TRIM)**
For setting of the optimal bias for the tape to be used.

㉞ **RECORD CALIBRATION TONE BUTTON (record cal tone)**
For recording level calibration according to the type of the type to be used.
When this switch is kept pressed, 400 Hz signal is recorded on the tape. Make adjustment by operating the RECORD CALIBRATION controls during reproduction of this signal recorded on the tape so that the LED LEVEL DISPLAY may indicate 0 dB.

㉟ **RECORD CALIBRATION CONTROLS (record cal)**
Variable resistors to calibrate the recording level to 0 dB according to the type of the tape to be used. Make adjustment with a thin screwdriver through the hole.

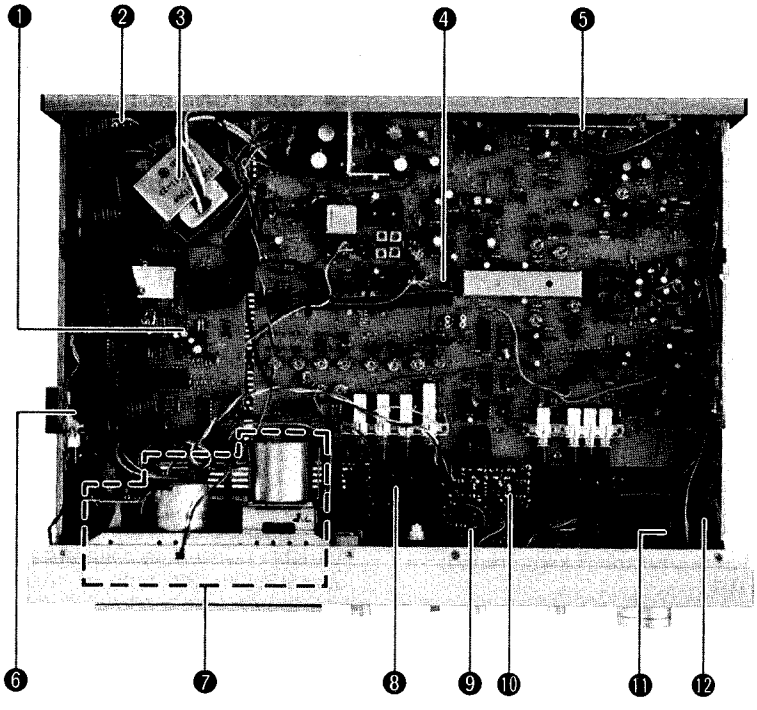
㊱ **OUTPUT LEVEL CONTROL (OUTPUT LEVEL)**
For control of the output level during playback or monitoring of the recording sound.
It also control the volume of the sound monitored through headphones.

㊲ **AUTO REPEAT BUTTON (auto repeat)**
For automatic repeating of playback operation to enable endless playback.
When this button is pressed, the tape is automatically rewound from the tape end to the beginning of the tape or to "000" of the TAPE COUNTER indication when the MEMORY button is pressed ON and then playback starts automatically.

㊳ **LINE INPUT LEVEL CONTROLS (LINE LEVEL)**
For input level control during recording from an external component.
The front side knob is for the left channel and the rear one is for the right channel. The knobs turn simultaneously when turned normally.

㊴ **HEADPHONES JACK (HEADPHONES)**
For connection of stereo headphones.
The sound volume can be adjusted by the OUTPUT LEVEL control.

INTERNAL VIEW



❶LOGIC CONTROL P. C. BOARD (PCB-3)
❷REMOTE CONTROL SOCKET P. C. BOARD (PCB-18)
❸POWER TRANSFORMER
❹MAIN P. C. BOARD (PCB-1)
❺INPUT AND OUTPUT JACKS P. C. BOARD (PCB-13)
❻POWER SWITCH P. C. BOARD (PCB-14)
❼CASSETTE TAPE RECORDER MECHANICAL ASSEMBLY
❽MIC. AND LINE AMP. P. C. BOARD (PCB-2)
❾METER BALLISTICS P. C. BOARD (PCB-6)
❿BIAS AND RECORD CAL. TONE P. C. BOARD (PCB-5)
⓫LINE LEVEL CONTROL P. C. BOARD (PCB-8)
⓬HEADPHONE JACK P. C. BOARD (PCB-7)

DISASSEMBLY PROCEDURES

1 CABINET TOP REMOVAL

Remove screws ❶ to ❻ in Fig. 1, then remove the cabinet top.

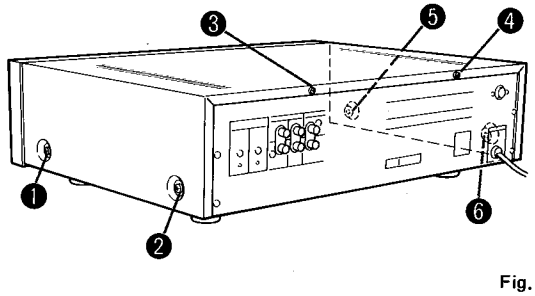


Fig. 1

2 CABINET BOTTOM REMOVAL

Remove screws ❶ to ⓯ in Fig. 2, then remove the cabinet bottom.

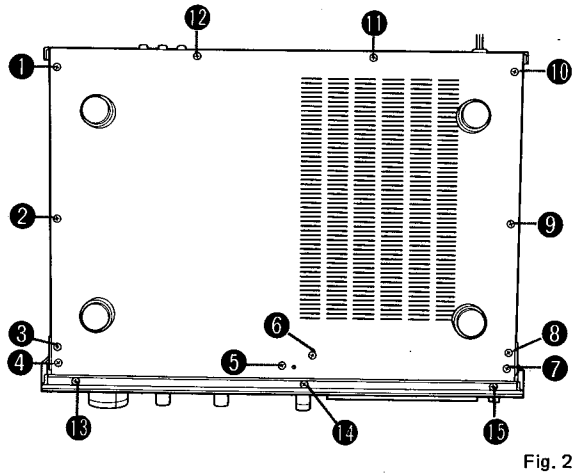


Fig. 2

3 FRONT PANEL ASSEMBLY REMOVAL

1. Remove the cabinet top and bottom. (See step 1 and 2)
2. Pull out the knobs of line level, output level, bias fine trim and microphones level.
3. Remove the cassette door assembly.
4. Remove the two connectors linking the key control P.C. board on the front panel and the logic control P.C. board and disconnect the GND line.
5. Remove screws ⓭ to ⓯ in Fig. 2 and screws ❶ to ❹ in Fig. 3, then pull the front panel slightly forward.
6. Remove the power indicator P.C. board and the electronic auto search indicator P.C. board.

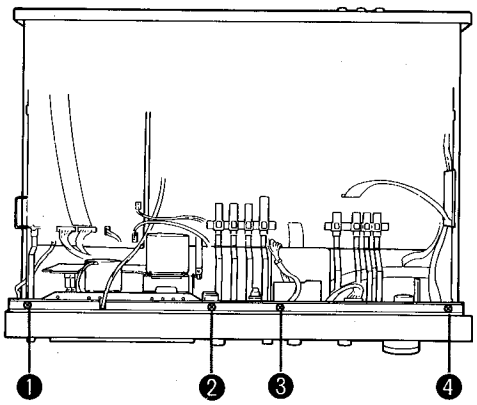


Fig. 3

4 LED DISPLAY, LED INDICATOR AND LAMP P.C. BOARD REMOVAL

1. Remove the front panel assembly. (See step 3)
2. Remove screws ❶ and ❷ on the back side of the front sub panel (Fig. 4) to remove the LED indicator P.C. board.
3. Disconnect the connector and remove screws ❸ to ❺ to remove the LED display.
4. Remove screws ❻ and ❼ to remove the lamp P.C. board.
5. When removing the LED display meter plate, also remove screws ❽ to ❿.

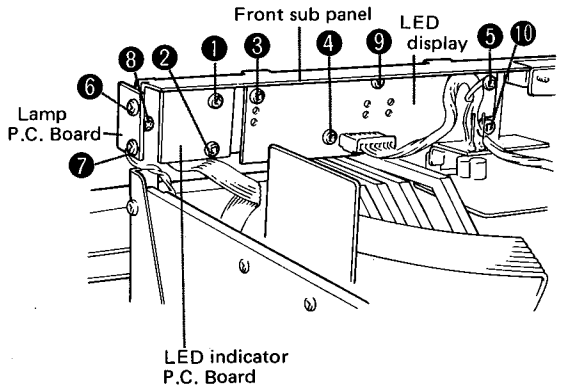


Fig. 4

5 METER BALLISTICS, BIAS/REC. CAL TONE P.C. BOARD AND AUTO REPEAT P.C. BOARD REMOVAL

1. Remove the LED display meter plate. (See step 4)
2. The meter ballistics and bias/rec. cal. tone P.C. boards can be removed from the back of the panel as a unit by removing screws ❶ and ❷ (Fig. 5) on the front sub panel.
3. Pull out the push button assembly (dolby NR, NR type, HX-PRO, MPX filter).
4. Remove the auto repeat P.C. board by removing screws ❸ and ❹ (Fig. 5) on the front sub panel.

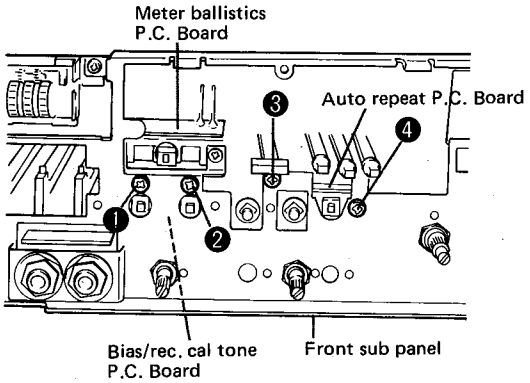


Fig. 5

6 MIC./LINE AMP. P.C. BOARD, HEADPHONE AMP. AND LINE LEVEL CONTROL P.C. BOARD REMOVAL

1. Remove the meter ballistics, bias/rec. cal. tone and auto repeat P.C. boards. (See step 5)
2. Remove the bias/equalization push buttons by pulling them forward.
3. Remove screws ❶ to ❺ from the front sub panel (Fig. 6) and pull the front sub panel slightly forward.
4. Remove the mic./line amp. P.C. Board by removing nuts ❻ to ❿ from the potentiometers and microphone jacks in Fig. 6.
5. Remove the line level control P.C. board in the same manner by removing nut ⓫ from the line level potentiometer.
6. Remove the headphone amp. P.C. board in the same manner by removing nut ⓬ from the headphone jack.

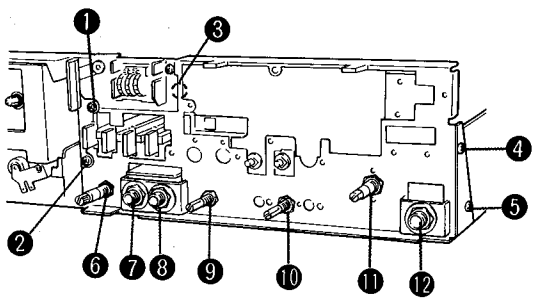


Fig. 6

7 LOGIC CONTROL P.C. BOARD REMOVAL

1. Remove the cabinet top. (See step 1)
2. Remove the remote control socket P.C. board and its connector from the rear panel (screws ❶ and ❷ in Fig. 7).
3. Disconnect connectors ⓐ to ⓗ on the logic control P.C. board.
4. Remove the four screws ❸ to ❻ holding the logic control P.C. board.
5. Unsolder the lead wires of logic control P.C. board and then remove the logic control P.C. board.

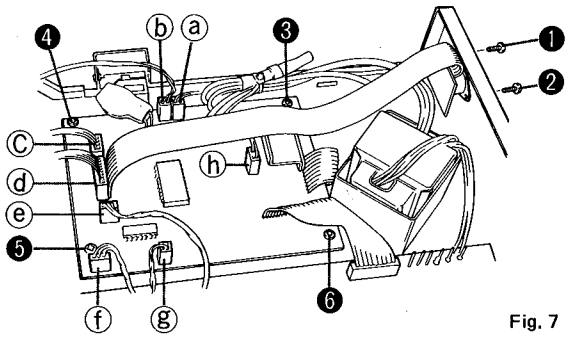


Fig. 7

8 CASSETTE TAPE RECORDER MECHANISM ASSEMBLY REMOVAL

1. Disconnect connectors ⓕ and ⓖ on the logic control P.C. board. (See Fig. 7.)
2. Disconnect the cassette mechanism lamp wiring from the terminals on the main P.C. board. (The wires must be unsoldered.)
3. Remove the push button of power switch.
4. Disconnect the cassette mechanism switch P.C. board connector.
5. Disconnect the record/playback head and erase head wires. (The wires must be unsoldered.)
6. Remove the LED display meter plate assembly. (See step 4.)
7. Remove the electronic auto search and rec. mute switches. (See Fig. 8.)
8. Remove the cassette mechanism and tape counter together by removing screws ❶ to ❹ in Fig. 8.

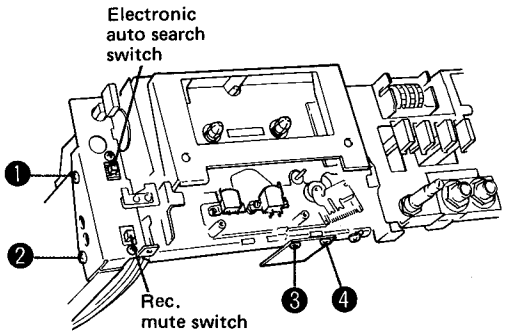


Fig. 8

9 DRESSING PLATE AND PLATE REMOVAL

1. Remove the cassette tape mechanism assembly. (See step 8)
2. Remove screws ❶ and ❷ in Fig. 9, then remove the dressing plate and plate.

*Be careful not to let the bushings at the back of the plate drop when screws ❶ and ❷ are removed.

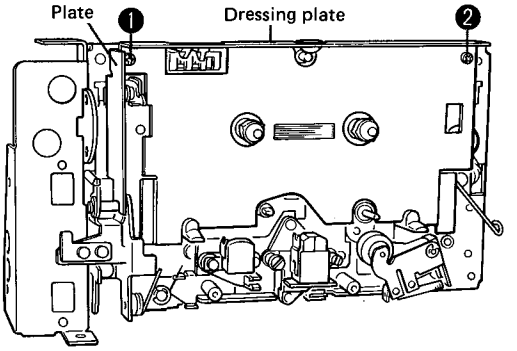


Fig. 9

10 PINCH ROLLER REPLACEMENT

1. Remove spring ❷ and E-stop ring ❶ in Fig. 10, then remove the pinch roller by pulling it forward.
2. Assemble the new pinch roller and lever as shown in Fig. 11 and slide the assembly onto the shaft. When doing this, fit part A into part B. Fasten the unit in place with the E-stop ring, then attach the spring.

*Do not apply heat for an excessive amount of time when soldering the head lead wires. Failure to observe this precaution may result in damage to the heads.

Be sure that there is sufficient slack in the lead wires before banding them together.

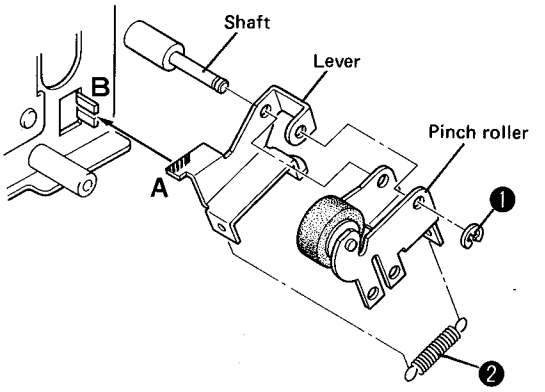


Fig. 10

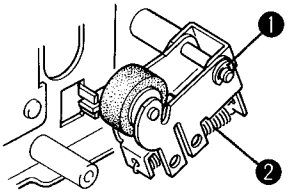


Fig. 11

11 ERASE HEAD REPLACEMENT

1. Disconnect the lead wires from the erase head. (The wires must be unsoldered; see Fig. 13.)
2. Remove screws ❶ and ❷ in Fig. 12 and replace the erase head. After replacing the screws, apply lock paint to prevent them from becoming loose.

12 RECORD/PLAYBACK HEAD REPLACEMENT

1. Disconnect the lead wires from the record/playback head. (The wires must be unsoldered; see Fig. 13.)
2. Remove screws ❸ and ❹ in Fig. 12 to remove the REC/PLAY head. The head may not come off after the screws have been removed because lock paint has has been applied to points A and B in the figure; however, it can easily by removed by scraping off the lock paint.
3. Temporarily fasten screws ❸ and ❹ to install the head. Screw ❹ may be tightened all the way, but screw ❸ should be left partly loose because it is used for azimuth adjustment; see paragraphs 1–3 on mechanism adjustment and paragraph 2 on electrical circuit adjustment. After these adjustments have been made, apply lock paint to the screw to prevent it from coming loose.

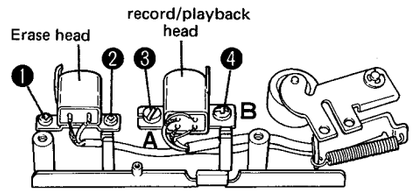


Fig. 12

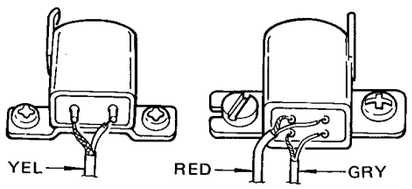


Fig. 13

13 REEL MOTOR AND CLUTCH REPLACEMENT

1. Remove the reel motor assembly from the mechanism by removing screws ❶ and ❷ in Fig. 14.
2. Remove the sub belt.

<Motor replacement>

1. Remove the motor by removing its two retaining screws.
2. When installing the new motor, push it in the direction of the arrows in Fig. 15. (See Fig. 14 for wiring.)

<Clutch replacement>

1. Remove the lock washer and replace the clutch.

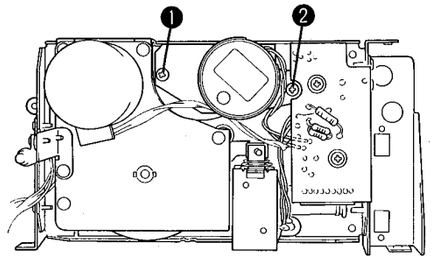


Fig. 14

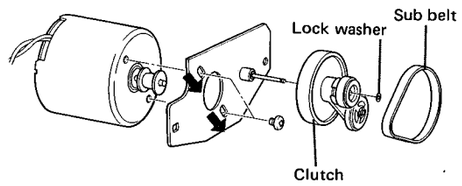


Fig. 15

14 CAPSTAN MOTOR, BELT, AND FLYWHEEL REPLACEMENT

1. Remove screw ❶ (Fig. 16) and remove the damper bracket.
2. Remove the motor bracket by removing screws ❷ to ❺ in Fig. 16. Remove the main belt from the motor pulley as this time.
3. Remove screws ❶ to ❸ in Fig. 17 and replace the capstan motor.
4. The flywheel can be removed by simply pulling it towards the back of the mechanism. When assembling the flywheel, be sure not to forget the washer. (See Fig. 18.)

Insert one washer from the front of the mechanism. There should be a slight gap between the washer and the flywheel hub when the flywheel is reinserted.

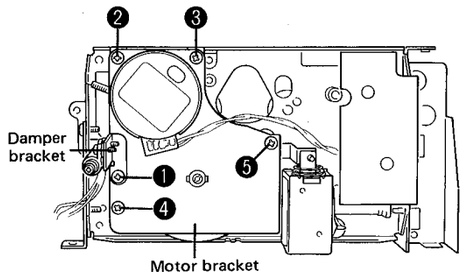


Fig. 16

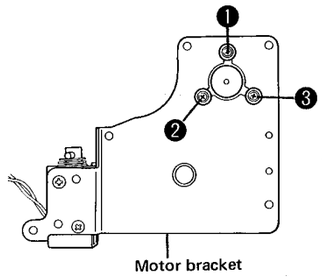


Fig. 17

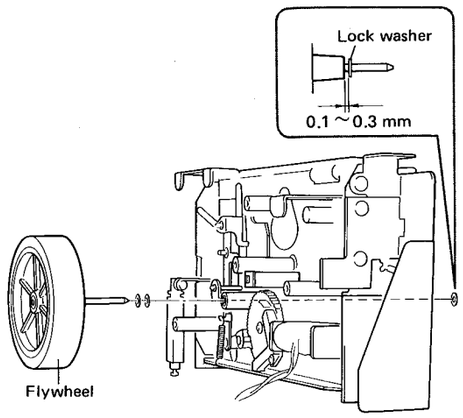


Fig. 18

11 ERASE HEAD REPLACEMENT

1. Disconnect the lead wires from the erase head. (The wires must be unsoldered; see Fig. 13.)
2. Remove screws ❶ and ❷ in Fig. 12 and replace the erase head. After replacing the screws, apply lock paint to prevent them from becoming loose.

12 RECORD/PLAYBACK HEAD REPLACEMENT

1. Disconnect the lead wires from the record/playback head. (The wires must be unsoldered; see Fig. 13.)
2. Remove screws ❸ and ❹ in Fig. 12 to remove the REC/PLAY head. The head may not come off after the screws have been removed because lock paint has has been applied to points A and B in the figure; however, it can easily by removed by scraping off the lock paint.
3. Temporarily fasten screws ❸ and ❹ to install the head. Screw ❹ may be tightened all the way, but screw ❸ should be left partly loose because it is used for azimuth adjustment; see paragraphs 1–3 on mechanism adjustment and paragraph 2 on electrical circuit adjustment. After these adjustments have been made, apply lock paint to the screw to prevent it from coming loose.

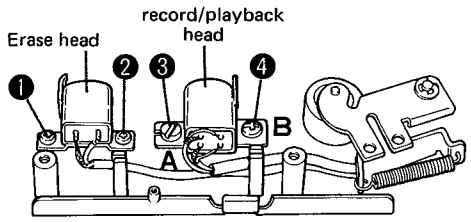


Fig. 12

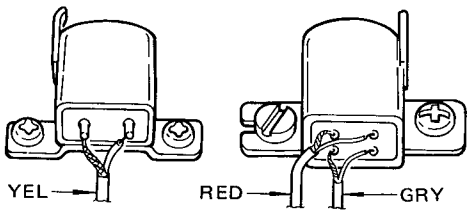


Fig. 13

13 REEL MOTOR AND CLUTCH REPLACEMENT

1. Remove the reel motor assembly from the mechanism by removing screws ❶ and ❷ in Fig. 14.
2. Remove the sub belt.

<Motor replacement>

1. Remove the motor by removing its two retaining screws.
2. When installing the new motor, push it in the direction of the arrows in Fig. 15. (See Fig. 14 for wiring.)

<Clutch replacement>

1. Remove the lock washer and replace the clutch.

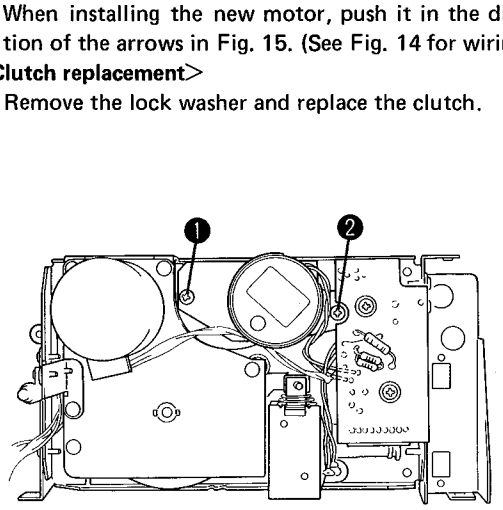


Fig. 14

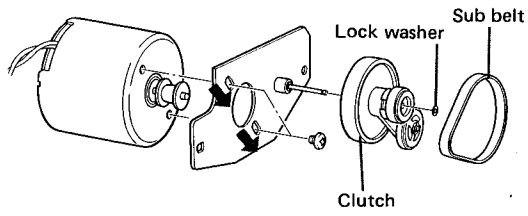


Fig. 15

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Fig. 14

ub belt

Fig. 15

14 CAPSTAN MOTOR, BELT, AND FLYWHEEL REPLACEMENT

1. Remove screw ❶ (Fig. 16) and remove the damper bracket.
2. Remove the motor bracket by removing screws ❷ to ❺ in Fig. 16. Remove the main belt from the motor pulley as this time.
3. Remove screws ❶ to ❸ in Fig. 17 and replace the capstan motor.
4. The flywheel can be removed by simply pulling it towards the back of the mechanism. When assembling the flywheel, be sure not to forget the washer. (See Fig. 18.)

Insert one washer from the front of the mechanism. There should be a slight gap between the washer and the flywheel hub when the flywheel is reinserted.

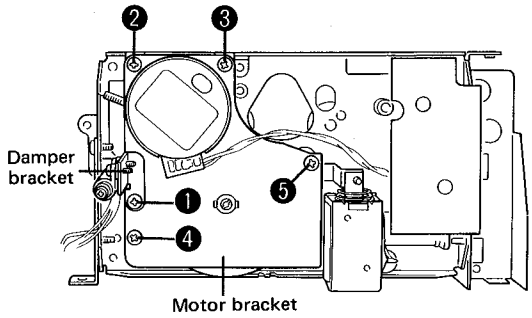


Fig. 16

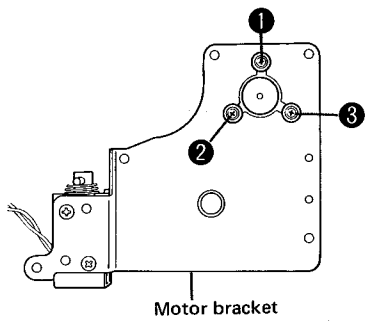


Fig. 17

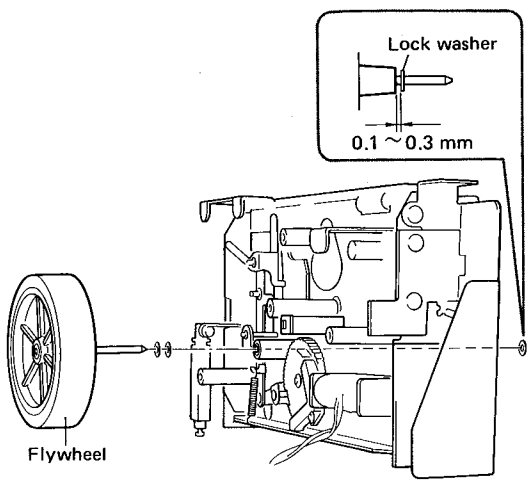


Fig. 18

SPECIFICATIONS

Track Configuration: 4-track 2 channel Stereo Cassette Deck

- **MECHANICAL SECTION**

	Nominal	Limit
Tape speed	4.75cm/sec.	± 1%
Wow and Flutter	0.04%	≤ 0.1%
F.FWD/REW. Time (for C-60 Cassette)	75 sec.	≤ 85 sec.
Motor	1-DC Servo Motor (Capstan) 1-Flat Torque DC Motor (Reel)	
Take Up Torque	50gcm	
F.FWD Torque	100gcm	
REW. Torque	100gcm	

- **HEAD SECTION**

Recording/Playback	Fe-Al-Si Alloy Core
Erase	Ferrite Core

- **AMPLIFIRE SECTION**

Input Censitivity

MIC.	0.65mV	(0.2mV min. ~ 1.0mV max.)
LINE(Low)	75mV	(50mV min. ~ 100mV max.)
LINE(High)	270mV	(200mV min. ~400mV max.)

Input Impedance

MIC.	2.7kΩ	(2.0kΩ min. ~4.0kΩ max.)
LINE(Low)	15kΩ	(10kΩ min. ~ 20kΩ max.)
LINE(High)	36kΩ	(20kΩ min. ~ 40kΩ max.)

Signal-to-Noise Ratio
(Dolby B to ON)
at MIC. input: 52dB ≥ 46dB (Input 1kHz, 1.5mV for normal tape)
at LINE(Low) input: 61dB (Input 1kHz, 100mV for normal tape)
(Dolby C to ON)
at LINE (Low) input: 68dB (Input 1kHz, 100mV for normal tape)

Erase Ratio: 67dB ≥ 60dB (Input 80Hz for metal tape)

Channel Separation: 45dB ≥ 35dB (Input 1kHz)

Crosstalk: 73dB ≥ 60dB (Input 1kHz)

- **DIMENSIONS (WxHxD)**: 17-3/7"x4-1/3"x12-7/4" (443x110x320mm)
- **WEIGHT**: 15.7 lbs (7.1 kg)
- **POWER SUPPLY**: AC 120V, 60Hz
- **POWER CONSUMPTION**: 34W

Specifications and components subject to change without notice.
Overall performance will be maintained or improved.

ALIGNMENT PROCEDURES

■ ELECTRICAL ADJUSTMENT

1. BEFORE ADJUSTMENT

- Make sure that primary supply voltage comes within 120V ± 2V.
- After the power switch is pushed on, wait for 10 minutes before measuring to be sere of the most stable operation.
- Since head magnetization, dust accumulations, etc. are likely to introduce error in the various characteristics, it is very important that the heads are properly demagnetized and cleaned before commencing any adjustment, particularly frequency response and head azimuth adjustment.
- Proceed with the recording section adjustment after having finished the playback section adjustment. Should the recording section adjustment be carried out without having completed the playback section adjustment perfectly, the recorded tape may not be played back properly with the other tape deck and the adjustment itself may become impossible.

2. INSTRUMENTS REQUIRED

- Low frequency oscillator
- AC VTVM or dual channel AC VTVM
- Oscilloscope
- Wow/flutter meter

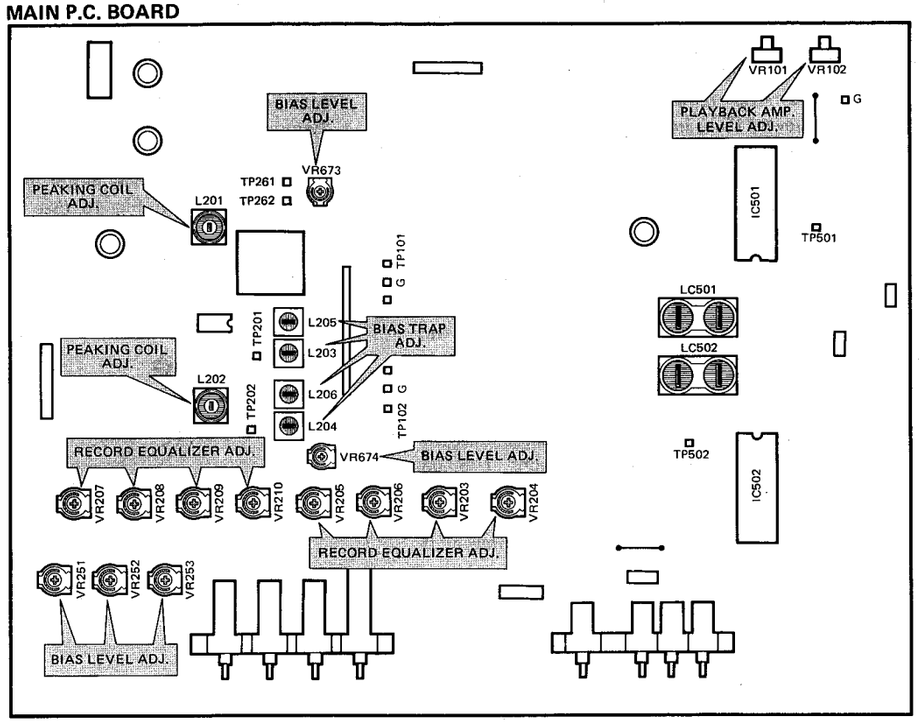
3. TEST TAPE

- Azimuth adjustment MTT-114
- TAPE speed adjustment MTT-111D
- Playback amp. level adjustment MTT-150
- Record level adjustment AC-512
- Frequency response adjustment
  - LN ..... XL-I
  - FeCr CS-30
  - CrO_2 ..... AC-512
  - Metal AC-711

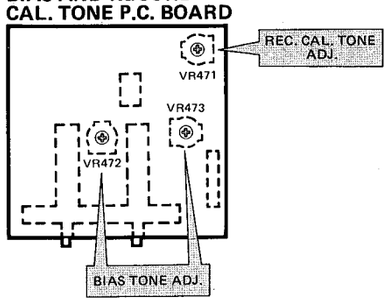
*C-90 differs with C-60 in the thickness and bias is unequal, so adjust with the tape whose bias is of specified value.

■ ADJUSTMENT AND TEST POINTS

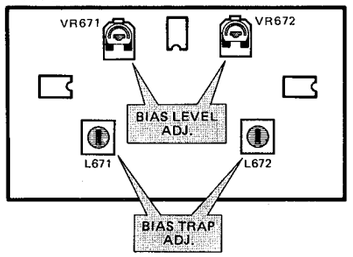
MAIN P.C. BOARD



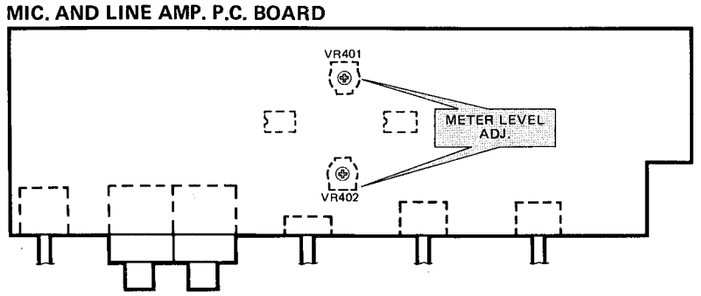
BIAS AND RECORD CAL. TONE P.C. BOARD



HX-PRO P.C. BOARD



MIC. AND LINE AMP. P.C. BOARD



SPECIFICATIONS

Track Configuration: 4-track 2 channel Stereo Cassette Deck

- **MECHANICAL SECTION**

	Nominal	Limit
Tape speed	4.75cm/sec.	± 1%
Wow and Flutter	0.04%	≤ 0.1%
F.FWD/REW. Time (for C-60 Cassette)	75 sec.	≤ 85 sec.
Motor	1-DC Servo Motor (Capstan) 1-Flat Torque DC Motor (Reel)	
Take Up Torque	50gcm	
F.FWD Torque	100gcm	
REW. Torque	100gcm	

- **HEAD SECTION**

Recording/Playback	Fe-Al-Si Alloy Core
Erase	Ferrite Core

- **AMPLIFIRE SECTION**

Input Censitivity

MIC.	0.65mV	(0.2mV min. ~ 1.0mV max.)
LINE(Low)	75mV	(50mV min. ~ 100mV max.)
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(Dolby B to ON)

at MIC. input: 52dB ≥ 46dB (Input 1kHz, 1.5mV for normal tape)

at LINE(Low) input: 61dB (Input 1kHz, 100mV for normal tape)

(Dolby C to ON)

at LINE (Low) input: 68dB (Input 1kHz, 100mV for normal tape)

Erase Ratio: 67dB ≥ 60dB (Input 80Hz for metal tape)

Channel Separation: 45dB ≥ 35dB (Input 1kHz)

Crosstalk: 73dB ≥ 60dB (Input 1kHz)

- **DIMENSIONS (WxHxD)** 17-3/7"x4-1/3"x12-7/4" (443x110x320mm)
- **WEIGHT** 15.7 lbs (7.1 kg)
- **POWER SUPPLY** AC 120V, 60Hz
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Specifications and components subject to change without notice. Overall performance will be maintained or improved.

ALIGNMENT PROCEDURES

■ ELECTRICAL ADJUSTMENT

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- Make sure that primary supply voltage comes within 120V ± 2V.
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- Wow/flutter meter

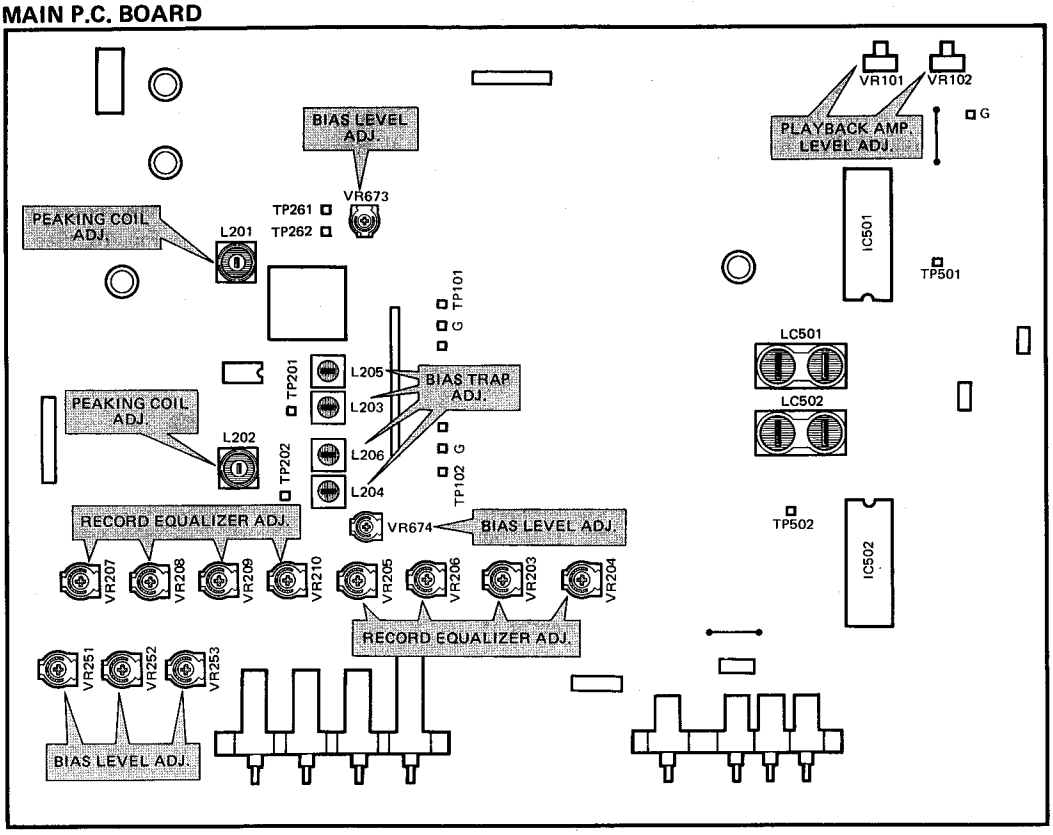
3. TEST TAPE

- Azimuth adjustment MTT-114
- TAPE speed adjustment MTT-111D
- Playback amp. level adjustment MTT-150
- Record level adjustment AC-512
- Frequency response adjustment
  - LN . . . . . XL-I
  - FeCr CS-30
  - CrO_2 . . . . . AC-512
  - Metal AC-711

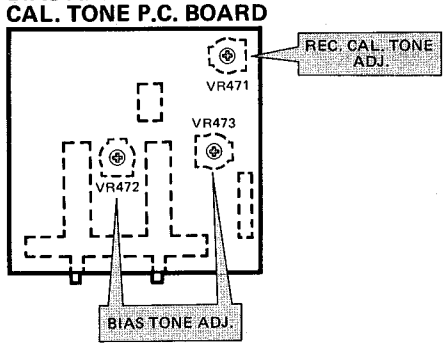
*C-90 differs with C-60 in the thickness and bias is unequal, so adjust with the tape whose bias is of specified value.

■ ADJUSTMENT AND TEST POINTS

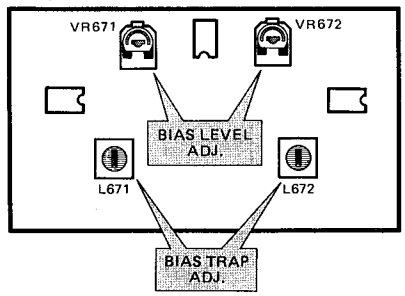
MAIN P.C. BOARD



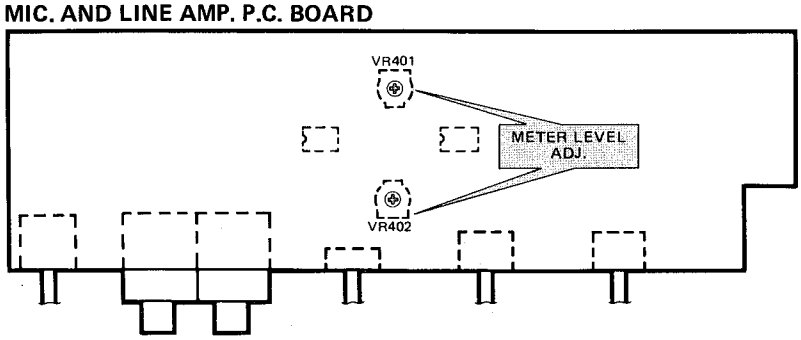
BIAS AND RECORD CAL. TONE P.C. BOARD



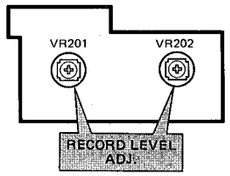
HX-PRO P.C. BOARD



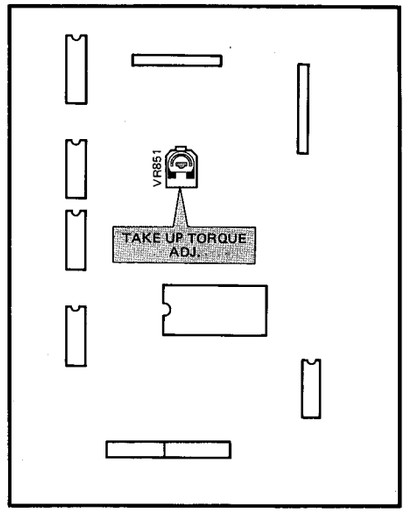
MIC. AND LINE AMP. P.C. BOARD



RECORD CAL. CONTROL P.C. BOARD



LOGIC CONTROL P.C. BOARD



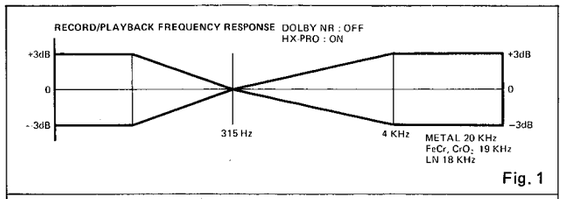


Fig. 1

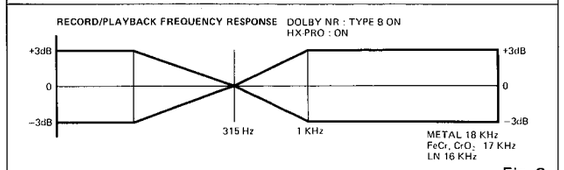


Fig. 2

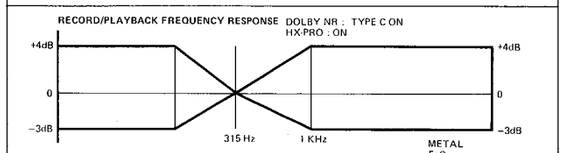


Fig. 3

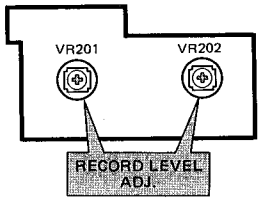
■ ELECTRICAL ADJUSTMENT AND CONFIRMATION

General conditions (unless otherwise noted)

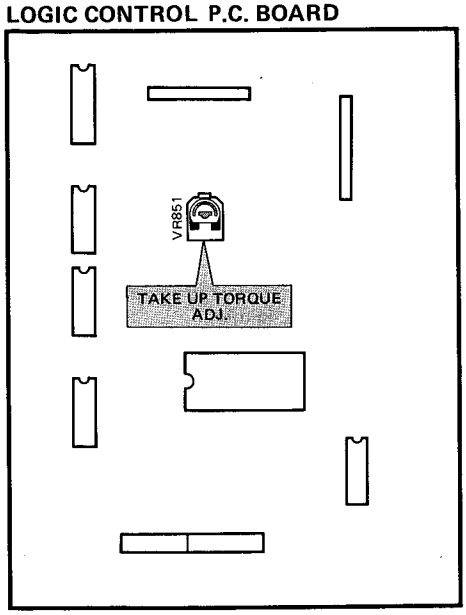
CONTROLS AND SWITCHES	SETTINGS
Dolby NR	off
MPX Filter	off
Microphones Level	min
Bias Fine Trim	center
Output Level	max
Line Level	max
HX-PRO	off

STEP		ADJUSTMENT ITEM	INSTRUMENT REQUIRED	MODE	INPUT SIGNAL	POINTS TO BE CONNECTED	ADJUSTMENT PART	RATING	REMARKS
1		Take up torque	Cassette tape torque meter (TW-2111)	PB			VR851	50gcm	
2		Azimuth	VTVM Test tape (MTT-114)	PB		TP501 or TP502	Azimuth screw	Maximum output	
3		Tape speed	Frequency counter Test tape (MTT-111D)	PB		TP501 or TP502	VR built in motor	3kHz ±10Hz	
4		Playback amp. level	VTVM Test tape (MTT-150)	PB		TP501 TP502	VR101 VR102	580 mV	
5	1	Bias trap	VTVM	REC-PAUSE		TP101 TP102	L205 L206	Maximum output	• Bias fine trim control is hi cut position. • Tape selector is metal position. • Turn the VR671 maximum clockwise and VR672 maximum counterclockwise positions. •Repeat adjustments 1 and 2, then do them again after completing adjustment 3.
	2					TP101 TP102	L671 L672	Maximum output	
	3					TP201 TP202	L203 L204	Minimum output	
6	1	Bias level (Pre-adjustment)	VTVM	REC-PAUSE		TP101 TP102	VR671 VR672	100 mV	• HX-PRO switch is on position. • Tape selector is metal position.
	2					TP101 or TP102	VR253	52 mV	• HX-PRO switch is on position. • Tape selector is CrO_2 position.
	3					TP101 or TP102	VR252	46 mV	• HX-PRO switch is on position. • Tape selector is FeCr position.
	4					TP101 or TP102	VR251	32 mV	• HX-PRO switch is on position. • Tape selector is LN position.
	5					TP101 TP102	VR673 VR674	52 mV	• Tape selector is CrO_2 position.

RECORD CAL. CONTROL P.C. BOARD



LOGIC CONTROL P.C. BOARD

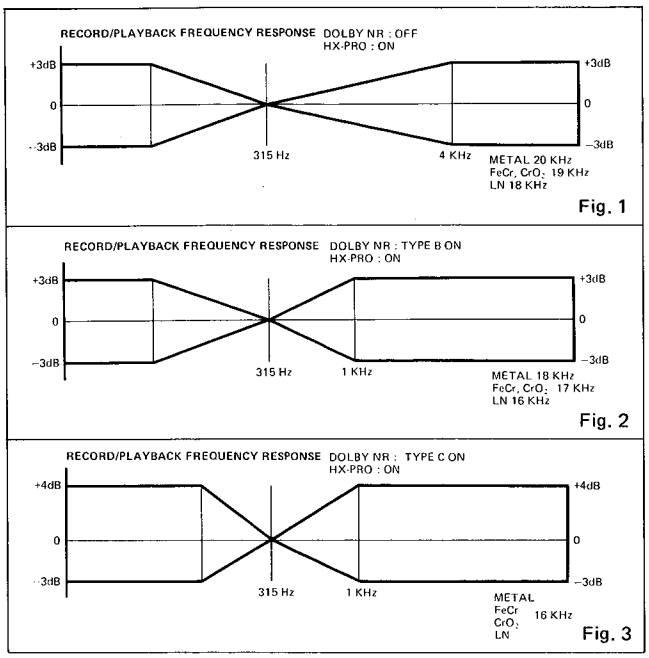


■ ELECTRICAL ADJUSTMENT AND CONFIRMATION

General conditions (unless otherwise noted)

CONTROLS AND SWITCHES	SETTINGS
Dolby NR	off
MPX Filter	off
Microphones Level	min
Bias Fine Trim	center
Output Level	max
Line Level	max
HX-PRO	off

STEP		ADJUSTMENT ITEM	INSTRUMENT REQUIRED	MODE	INPUT SIGNAL	P
1		Take up torque	Cassette tape torque meter (TW-2111)	PB		
2		Azimuth	VTVM Test tape (MTT-114)	PB		
3		Tape speed	Frequency counter Test tape (MTT-111D)	PB		
4		Playback amp. level	VTVM Test tape (MTT-150)	PB		
5	1	Bias trap	VTVM	REC-PAUSE		
	2					
	3					
6	1	Bias level (Pre-adjustment)	VTVM	REC-PAUSE		
	2					
	3					
	4					
	5					



L	POINTS TO BE CONNECTED	ADJUSTMENT PART	RATING	REMARKS
		VR851	50gcm	
	TP501 or TP502	Azimuth screw	Maximum output	
	TP501 or TP502	VR built in motor	3kHz ±10Hz	
	TP501 TP502	VR101 VR102	580 mV	
	TP101 TP102	L205 L206	Maximum output	• Bias fine trim control is hi cut position. • Tape selector is metal position. • Turn the VR671 maximum clockwise and VR672 maximum counterclockwise positions. •Repeat adjustments 1 and 2, then do them again after completing adjustment 3.
	TP101 TP102	L671 L672	Maximum output	
	TP201 TP202	L203 L204	Minimum output	
	TP101 TP102	VR671 VR672	100 mV	• HX-PRO switch is on position. • Tape selector is metal position.
	TP101 or TP102	VR253	52 mV	• HX-PRO switch is on position. • Tape selector is CrO_2 position.
	TP101 or TP102	VR252	46 mV	• HX-PRO switch is on position. • Tape selector is FeCr position.
	TP101 or TP102	VR251	32 mV	• HX-PRO switch is on position. • Tape selector is LN position.
	TP101 TP102	VR673 VR674	52 mV	• Tape selector is CrO_2 position.

STEP	ADJUSTMENT ITEM	INSTRUMENT REQUIRED	MODE	INPUT SIGNAL	POINTS TO BE CONNECTED	ADJUSTMENT PART	RATING	REMARKS
7	Peaking coil (Pre-adjustment)	VTVM	REC	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP101 and TP102 voltage is 1 mV. Then, adjust with a 23kHz signal.	TP101 TP102	L201 L202	Maximum output	• Short the TP261 and TP262.
8-1	Record equalizer (Pre-adjustment)	VTVM	REC	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP101 and TP102 voltage is l mV (at each position of tape selector). Then, adjust with a 8kHz signal.	TP101 TP102	VR207 VR208	2.05 mV	• Tape selector is metal position. • Short the TP261 and TP262.
8-2					TP101 TP102	VR209 VR210	2.05 mV	• Tape selector is CrO_2 position. • Short the TP261 and TP262.
8-3					TP101 TP102	VR205 VR206	2.9 mV	• Tape selector is FeCr position. • Short the TP261 and TP262.
8-4					TP101 TP102	VR203 VR204	1.45 mV	• Tape selector is LN position. • Short the TP261 and TP262.
9	Record level (Pre-adjustment)	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502	VR201 VR202	580 mV	• Tape selector is CrO_2 position.
10	Record/playback equalizer frequency characteristic (Pre-adjustment)	VTVM Blank tape (AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE OUT	VR671 VR672	So that the record/playback frequency response is flat.	• HX-PRO switch is on position. • Tape selector is metal position.
11-1	Record/playback equalizer frequency characteristic	VTVM Blank tapes (LN XL-I; FeCr CS-30; CrO_2 AC-512; metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE OUT	VR253 L202	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is CrO_2 position. • Fast, with VR253 and L202 adjust Rch as specified in rating. As adjusting VR253 causes a slight change in frequency response of Lch, make a fine adjustment with VR671 and L201 as specified in rating.
11-2					TAPE OUT	VR671 L201	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is metal position. • Fast, with VR671 and L201 adjust Lch as specified in rating. As adjusting VR671 causes a slight change in frequency response of Rch, make a fine adjustment with VR253 and L202 as specified in rating.
11-3					TAPE OUT		Confirm record/playback frequency response. If the frequency response is not within the range in Fig. 1, do the adjustment, over starting with step 10.	• HX-PRO switch is on position. • Tape selector is metal position. • Only when VR671 is adjusted in step 11-2, readjust Lch finely with VR207.
11-4					TAPE OUT	VR207	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	
11-5					TAPE OUT	VR252	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is FeCr position.
11-6						VR205		
11-7					TAPE OUT	VR251	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is LN position.
11-8						VR203		
11-9					TAPE OUT	VR673 VR674	So that the record/playback frequency response is flat.	• Tape selector is CrO_2 position.
11-10					TAPE OUT		Confirm record/playback frequency response. If frequency response is not the same as for step 11-9, adjust while watching the balance of the two.	• Tape selector is LN position.
12	Record level	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502	VR201 VR202	580 mV	• Tape selector is CrO_2 position.
13	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes (LN XL-I; FeCr CS-30; CrO_2 AC-512; metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE OUT		Confirm that record/playback frequency response is within the range in Fig. 2 and 3. If it is not within the range in Fig. 2 and 3, redo the adjustments on steps 10 and 11.	• This confirmation should be done at each tape selector position under each of the following conditions, Dolby B, Dolby C, Dolby B and HX-PRO ON, Dolby C and HX-PRO ON.
14	Record calibration tone level	VTVM	REC-PAUSE		TP501 TP502	VR471	580 mV (Adjust balance if there is a difference in value between the L and R channels.)	• Keep pressing the RECORD CAL. TONE button.
15-1	Bias tone level	VTVM	REC-PAUSE		TP501	VR472	58 mV	• Keep the BIAS TONE button pressed.
15-2					TP502	VR473	58 mV–0.3dB	
16	Meter level	VTVM 10kΩ load (to TAPE out)	REC-PAUSE	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–0.5dB when REC-PAUSE mode.		VR401 VR402	0 VU LED lights dimly.	• Output level control at center.

STEP	ADJUSTMENT ITEM	INSTRUMENT REQUIRED	MODE	INPUT SIGNAL	POINTS TO CONNEC
7	Peaking coil (Pre-adjustment)	VTVM	REC	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP101 and TP102 voltage is 1 mV. Then, adjust with a 23kHz signal.	TP101 TP102
8-1	Record equalizer (Pre-adjustment)	VTVM	REC	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP101 and TP102 voltage is I mV (at each position of tape selector). Then, adjust with a 8kHz signal.	TP101 TP102
8-2					TP101 TP102
8-3					TP101 TP102
8-4					TP101 TP102
9	Record level (Pre-adjustment)	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502
10	Record/playback equalizer frequency characteristic (Pre-adjustment)	VTVM Blank tape (AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE C
11-1	Record/playback equalizer frequency characteristic	VTVM Blank tapes (LN XL-I; FeCr CS-30; CrO_2 AC-512; metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE C
11-2					
11-3					TAPE C
11-4					
11-5					TAPE C
11-6					
11-7					TAPE C
11-8					
11-9					TAPE C
11-10					TAPE C
12	Record level	VTVM Blank tape (AC-512)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV when REC-PAUSE mode.	TP501 TP502
13	Record/playback equalizer frequency characteristic confirmation	VTVM Blank tapes (LN XL-I; FeCr CS-30; CrO_2 AC-512; metal AC-711)	REC/PB	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–25dB when REC-PAUSE mode. Then, adjust with a 20Hz to 30kHz sweep signal.	TAPE
14	Record calibration tone level	VTVM	REC-PAUSE		TP501 TP502
15-1	Bias tone level	VTVM	REC-PAUSE		TP501
15-2					TP502
16	Meter level	VTVM 10kΩ load (to TAPE out)	REC-PAUSE	Apply 400Hz signal to LINE INPUT LOW. Set LINE LEVEL knob so that TP501 and TP502 voltage is 580 mV–0.5dB when REC-PAUSE mode.	

	POINTS TO BE CONNECTED	ADJUSTMENT PART	RATING	REMARKS
T LOW. 01 and t with a	TP101 TP102	L201 L202	Maximum output	• Short the TP261 and TP262.
	TP101 TP102	VR207 VR208	2.05 mV	• Tape selector is metal position. • Short the TP261 and TP262.
T LOW. 01 and tion of 8kHz	TP101 TP102	VR209 VR210	2.05 mV	• Tape selector is CrO_2 position. • Short the TP261 and TP262.
	TP101 TP102	VR205 VR206	2.9 mV	• Tape selector is FeCr position. • Short the TP261 and TP262.
	TP101 TP102	VR203 VR204	1.45 mV	• Tape selector is LN position. • Short the TP261 and TP262.
T LOW. 01 and C-PAUSE	TP501 TP502	VR201 VR202	580 mV	• Tape selector is CrO_2 position.
T LOW. 501 and hen REC- 20Hz to	TAPE OUT	VR671 VR672	So that the record/playback frequency response is flat.	• HX-PRO switch is on position. • Tape selector is metal position.
	TAPE OUT	VR253 L202	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is CrO_2 position. • Fast, with VR253 and L202 adjust Rch as specified in rating. As adjusting VR253 causes a slight change in frequency response of Lch, make a fine adjustment with VR671 and L201 as specified in rating.
		VR671 L201		
T LOW. 501 and hen REC- 20Hz to	TAPE OUT		Confirm record/playback frequency response. If the frequency response is not within the range in Fig. 1, do the adjustment, over starting with step 10.	• HX-PRO switch is on position. • Tape selector is metal position. • Only when VR671 is adjusted in step 11-2, readjust Lch finely with VR207.
		VR207	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	
	TAPE OUT	VR252 VR205	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is FeCr position.
	TAPE OUT	VR251 VR203	So that the record/playback frequency response is flat. (At least within the range in Fig. 1)	• HX-PRO switch is on position. • Tape selector is LN position.
	TAPE OUT	VR673 VR674	So that the record/playback frequency response is flat.	• Tape selector is CrO_2 position.
	TAPE OUT		Confirm record/playback frequency response. If frequency response is not the same as for step 11-9, adjust while watching the balance of the two.	• Tape selector is LN position.
T LOW. 501 and EC-PAUSE	TP501 TP502	VR201 VR202	580 mV	• Tape selector is CrO_2 position.
IT LOW. 501 and hen REC- 20Hz to	TAPE OUT		Confirm that record/playback frequency response is within the range in Fig. 2 and 3. If it is not within the range in Fig. 2 and 3, redo the adjustments on steps 10 and 11.	• This confirmation should be done at each tape selector position under each of the following conditions, Dolby B, Dolby C, Dolby B and HX-PRO ON, Dolby C and HX-PRO ON.
	TP501 TP502	VR471	580 mV (Adjust balance if there is a difference in value between the L and R channels.)	• Keep pressing the RECORD CAL. TONE button.
	TP501	VR472	58 mV	• Keep the BIAS TONE button pressed.
	TP502	VR473	58 mV–0.3dB	
IT LOW. 501 and when REC-		VR401 VR402	0 VU LED lights dimly.	• Output level control at center.

■ MECHANISM ADJUSTMENT AND CONFIRMATION

ITEM	TOOLS USED	ADJUSTMENT POINT	STANDARD	REMARKS
Head height adjustment	Head gauge MAZ-0057 (chip MAZ-0181(C)) /M-300 (chip MAZ-0181(D))		Confirm alignment with head gauge. (Fig. 1)	Slipping adjustment washers under the heads.
Head position adjustment (PLAY)	Head gauge MAZ-0057/ M-300	Adjustment screw a, b and c	Record/playback head, 0—MAX; erase head, MIN—0	
Head position adjustment (AUTO SCAN)	Head gauge MAZ-0057 (chip MAZ-0181(A)) /M-300 (chip MAZ-0181(B))	Adjustment screws E and F	Record/playback head, 0—MAX (as close to 0 as possiple)	
Pinch roller pressure adjustment	Dial tension gauge (1,000g.)	Lever ▨ section (Fig. 6)	350g ± 30g	
Back tension adjustment	Cassette torque meter (TW-2111)	Back tension lever	5.5gcm	
Take-up torque confirmation	Cassette torque meter		50gcm ± 1gcm	Replace clutch if torque is not within limits as per VR851.
FF, REW torque confirmation	Dial torque gauge (300gcm)		130gcm ± 20gcm	
Brake torque confirmation	Dial torque gauge (90gcm)		120gcm	Measure in clockwise direction for take-up reel, in counter-clockwise direction for supply reel.
Capstan spindle back clearance confirmation				Fig. 10
Tape travel confirmation	Mirror cassette (MTT-902)		Confirm that the tape, erase and Record/playback heads, pinch roller, and capstan are properly positioned.	

■ TAPE GUIDE ADJUSTMENT

• PURPOSE

The tape guides not only determine the route of tape travel, but act to limit up/down movement of the tape. Therefore, they must be carefully adjusted to avoid damage to the tape edges or abnormal travel.

• INSPECTION PROCEDURE

1. Insert the head gauge and place the unit in the PLAY state.
2. Make sure that the adjustment chip is not in contact with the tape guides of both heads.

• ADJUSTMENT PROCEDURE

Adjust as follows if either of the adjustment chips catch on the tape guides.

In case of record/playback head, adjust by turning adjustment screws A or B. Both adjustment screws should be turned in the same direction.

In case of erase head, loosen the adjustment screws C and D and insert an adjusting washer under the head.

Special washer	2410-5017	Thickness 0.1 mm
Special washer	2410-5018	Thickness 0.2 mm
Special washer	2410-5019	Thickness 0.3 mm

[NOTES]

1. Ensure that the head gauge is firmly set in place.

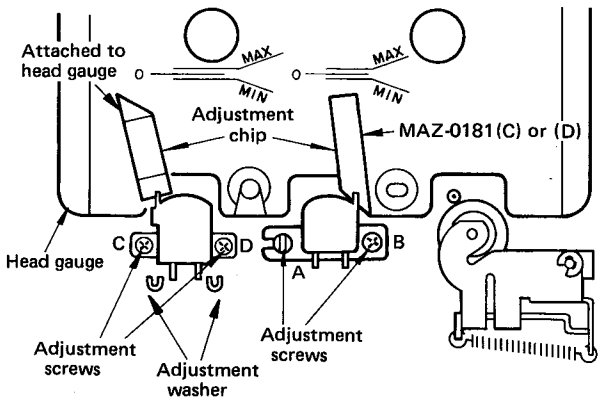


Fig. 1

■ HEAD ADJUSTMENT (PLAY state)

• PURPOSE

The heads must move when the unit is switched from STOP to PLAY or REC.. The position of the heads with relation to the cassette at such time is determined according to the cassette standards. Lack of proper contact with the tape will result if the heads are moved too far or not far enough; therefore, head positioning must be adjusted very carefully.

• INSPECTION PROCEDURE

1. Insert the head gauge and place the unit in the PLAY state.
2. The heads are properly positioned if the ends of the adjustment chips are within the specified range when they are perpendicular to and in light contact with the centers of the heads.
   Record/Playback head: 0—MAX
   Erase head: MIN—0

• ADJUSTMENT PROCEDURE

Make the adjustment by loosening head retaining screws (A), (B) and (C).
The adjustment range for both the record/playback head and erase head is from 0 to MAX, but should be as close to 0 (reference as possible).

[NOTES]

1. Confirm that the head gauge is pressed in the direction indicated by the arrow (⇩) when it is inserted.
2. With the unit in the playback mode, raise the sub-chassis by hand and confirm that the head gauge does not move out of position before making the adjustment.
3. Reduce the supply voltage when making this adjustment.

• FOR REFERENCE

Relationship between head position and MAX—MIN on the head gauge.
The position in which the heads are installed is specified as shown in Figure 3 above. Use the head gauge to ensure that the heads are positioned within the indicated ranges when they are installed.
Relationship between specified ranges and MAX—0—MIN on the head gauge.

RECORD/PLAYBACK HEAD

MAX position: 3.1 (—0.25 of tolerance)
0 position: 3.35 (center)
MIN position: 3.8 (+0.45 of tolerance)

ERASE HEAD

MAX position: 3.3 (—0.2 of tolerance)
0 position: 3.5 (center)
MIN position: 4.0 (+0.5 of tolerance)

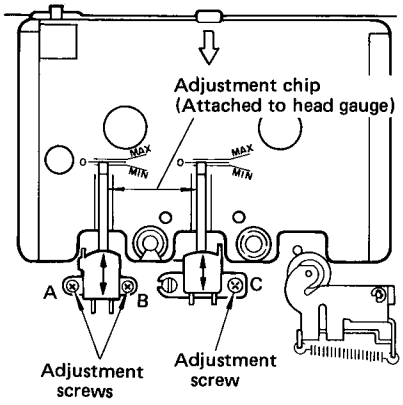


Fig. 2

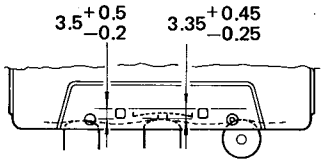


Fig. 3

■ HEAD ADJUSTMENT (AUTO-SCAN state)

• PURPOSE

The head position must be adjusted to ensure that the tape signal is correctly detected during auto scan operation. If the Record/playback head moves out too far the tape will not be taken up properly, while if it does not move out far enough the tape signal will not be detected.

• INSPECTION PROCEDURE

1. Insert the head gauge and place the unit in the AUTO-SCAN state.
2. Ensure that the end of the adjustment chip is within the specified range when it is perpendicular to and in light contact with the center of the Record/playback head.
   Record/playback head: 0—MAX

• ADJUSTMENT PROCEDURE

1. Loosen the adjustment screws and adjust the head position in the same manner as for PLAY. However, be sure to recheck the PLAY position of the head after doing this.
2. If specifications cannot be satisfied for both the PLAY and SCAN states, make fine adjustments by bending the lever shown in Fig. 5 at the point marked ※

[NOTES]

1. Ensure that the head gauge is securely inserted.
2. Although the adjustment range is given as 0—MAX, the adjustment should be as close to 0 as possible. However, it must not be less than 0.

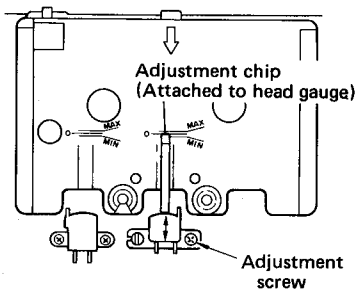


Fig. 4

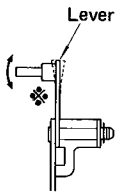


Fig. 5

■ PINCH ROLLER ADJUSTMENT

• PURPOSE

High tape tension is obtained when the pinch roller pressure is high. However, an excessive load is exerted on the spindle bearings of the capstan and the pinch roller if the pressure is too high. This can result in destructive side pressure which will shorten the life of the spindle bearings and cause wow and flutter. Further, the rubber contact surface of the pinch roller is excessively deformed in such cases, and the resulting variations in hardness can also produce wow and flutter and hasten deterioration of the rubber.

If the amount of pressure is too small, wow and flutter can result due to slipping; therefure, the pressure must be adjusted to within the range which will give stable tape speed.

• INSPECTION PROCEDURE

1. Place the unit in the PLAY state and confirm that the gap between the pinch roller and the level is 0.3 mm ± 0.1 mm.
2. With the unit in the PLAY state, apply the dial tension gauge to the pinch roller spindle and exert pressure in the direction indicated by the arrow (⇗) for a distance of about 0.2mm (to the point where the pinch roller stops turning). Then, gradually return the gauge in the opposite direction (⇖) and confirm that the pinch roller starts turning when the tension gauge reads 350 g. ± 30 g.

• ADJUSTMENT PROCEDURE

Inspection item 1 . . Adjust by moving the section of the lever to the right or left(↔).

Inspection item 2 . . Adjust by bending the section of the lever in the direction indicated by the arrow (↷).
Pressure is increased if this section of the lever is bent to the left (↶), and reduced if it is bent to the right (↷).

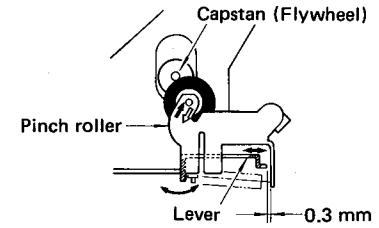


Fig. 6

■ BACK TENSION ADJUSTMENT

• PURPOSE

Back tension is applied during PALY to improve contact between the tape and the head. If back tension is insufficient, the tape is jerked when the unit is switched to PLAY and tape speed will be uneven while the resulting slack is taken up. If back tension is too great, the tape is subjected to excessive tension which can stretch it or cause the capstan drive to slip (resulting in wow just before slippage occurs). If back tension on the supply reel spindle is not even, wow becomes particularly pronounced as the end of the tape is neared because the relative amount of back tension is increased.

• INSPECTION PROCEDURE

1. Clean the reel spindles (both supply and take up) with freon.
2. Use a jug (MAZ-0192) to age the mechanism (place the unit in the PLAY state for approximately 5 seconds).
3. Insert the cassette torque meter in the mechanism and place it in the PLAY state.
4. Confirm that the torque meter reads 5.5 gcm ± 1 gcm at this time.

• CHECK ITEMS

Check the following when the torque meter reading is not as specified.

1. Visually confirm that gap (a) in Fig. 7 is approximately 0.4mm while the unit is in the PLAY state.
2. Visually confirm that gap (b) in Fig. 7 is approximately 0.4mm while the unit is in the CUE state.

• ADJUSTMENT PROCEDURE

1. When gap (a) is not as specified while the unit is in the PLAY state, adjust is by bending the section of the back tension lever in the direction indicated by the arrow (⇘).
2. When gap (b) is not as specified while the unit is in the CUE state, adjust it by bending the section of the back tension lever in the direction indicated by the arrow (⇘).

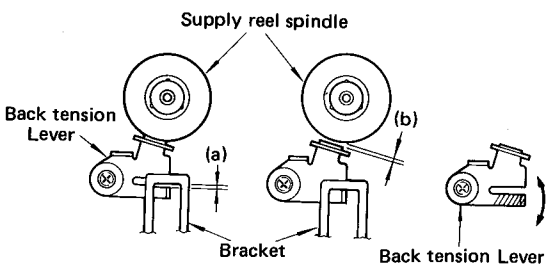


Fig. 7

■ TAKE-UP TORQUE CONFIRMATION

• PURPOSE

Take-up torque must be applied to the reel spindle to ensure that the tape is taken up at a constant speed. If the take-up torque is too high, the tape will be subjected to excessive tension and become stretched or curled, or the tape travel position will change, resulting in wrinkling or damage to the edge of the tape. However, if the take-up torque is too low the tape will become loose and may not be wound up evenly.

• INSPECTION PROCEDURE

Replace the clutch if no slippage occurs and the take-up torque is not wihin specifications as per VR851.

[NOTES]

1. Check whether the torque meter reading on the take-up side varies by more than ±5 g—cm as the reel spindle goes through one revolution. If so, the drive section is dirty and should be cleaned with freon or the like. Repeat the check after cleaning.
2. Reconfirm the take-up torque after the unit has been completely assembled.

■ F. FWD AND REW. TORQUE CONFIRMATION

• PURPOSE

To confirm that the tape is taken up correctly.

• INSPECTION PROCEDURE

1. Place the unit in the FF and REW states.
2. Slip the dial torque gauge vertically onto the reel spindle, holding the gauge with the fingers so that "0" marks are aligned.
3. After slipping the gauge onto the reel spindle, gradually move your finger away from the rotating part at the bottom (the part marked ※ in Fig. 8).
4. Confirm that dial torque gauge reads 130 gcm ± 20 gcm.

[NOTES]

1. Hold the dial torque gauge so that there is a gap between it and the reel spindle as shown in the figure.
2. Attach a cassette hub to the tip of the gauge (to its center).
3. Usually, low FF or REW torque readings are due to grease or dirt on the drive section; therefore, this section should be cleaned with freon or the like before taking the readings.

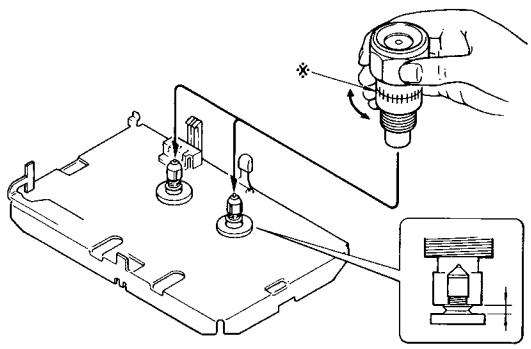


Fig. 8

■ BRAKE TORQUE CONFIRMATION

• PURPOSE

The function of the brake is to stop the tape as quickly and surely as possible without subjecting it to excessive tension or allowing it to become slack when switching from FF, REW., or PLAY to STOP. However, in order to protect the tape, the brake must not be applied until after the drive force has been removed. Further, greater braking force must be applied to the reel spindle on the supply side than to that on the take-up side in order to prevent the tape from overrunning.

• INSPECTION PROCEDURE

1. With the mechanism in the STOP state, slip the dial torque gauge vertically onto the reel spindle.
2. Slowly rotate the top of the dial gauge (in the clockwise direction for the take-up reel and in the counter-clockwise direction for the supply reel) and confirm that it reads 120 gcm ± 50 gcm when the reel spindle starts turning.

[NOTES]

1. Usually, low brake torque readings are due to grease or dirt on the brake shoes or reel spindles; therefore, these sections should be cleaned with freon or the like before taking the readings.
2. If the brakes do not operate smoothly because they have become deformed, they must be repaired or replaced.

■ CAPSTAN BACK END CLEARANCE CONFIRMATION

• PURPOSE

The capstan is provided with a small amount of clearance at its back end (and the smaller, the better). When the unit is used vertically, the capstan becomes horizontal and vibrates in its own axial direction. This causes wow flutter level variation. To prevent such a situation, a spring is inserted so that the capstan is stabilized with light pressure applied in the axial direction. Without any clearance, friction causes burning. Therefore, the purpose of this inspection is to confirm that a proper clearance is obtained at the back end of the capstan to allow the spring to take effect.

• INSPECTION PROCEDURE

1. Pull the capstan in the direction of arrow ⇩ and confirm that the clearance (a) is more than 0.1 mm.
2. Push the capstan in the direction of arrow ⇧ and confirm that the clearance (b) is within 0.8 mm.

[NOTES]

1. When the clearance (a) is made 0 (by pushing the bearing in the direction of the arrow lightly), the flywheel (capstan) must be free from play.
2. When the unit is placed vertically and is set in the play mode, the flywheel pushed by the bearing must maintain smooth and constant revolution at the fixed position.

3. Also, check to make sure that vibration along the capstan shaft does not cause the capstan oil shield washer to come in contact with the cassette half, bracket, or bearing.

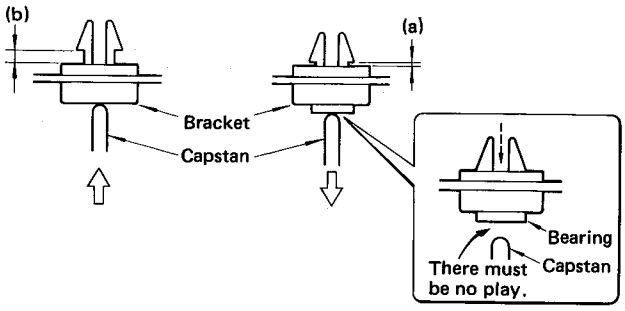


Fig. 9

■ TAPE TRAVEL CONFIRMATION

• PURPOSE

If the edges of the tape are in constant contact with the tape guides during tape travel, the tape will be subjected to excessive wear and will not be in proper contact with the head; this will result in increased variations in level. Thterefore, proper tape travel must be confirmed using the mirror cassette.

• INSPECTION PROCEDURE

1. Set the mirror cassette in the mechanism.
2. Place the mechanism in the PLAY state.
3. Confirm that tape travel is as shown in Fig. 12; the tape should not be in contact with the tape guides and should be centered on the pinch roller.
4. Play particular attention to the splice between the tape leader and the magnetic tape.

• ADJUSTMENT PROCEDURE

There is a problem with one of the following if the tape is in contact with the tape guides as shown in Fig. 13 or 14 above.

- ○ Pinch roller perpendicularity
- ○ Record/playback head height
- ○ Record/playback head angle
- ○ Erase head height

a) The pinch roller is at fault if the tape is as shown in Fig. 13.

b) Head height is the problem in the case of Fig. 14.

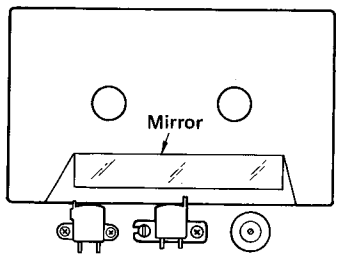


Fig. 10

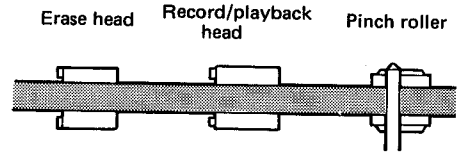


Fig. 11

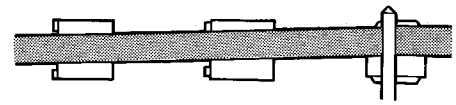


Fig. 12

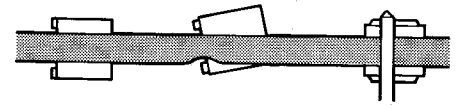
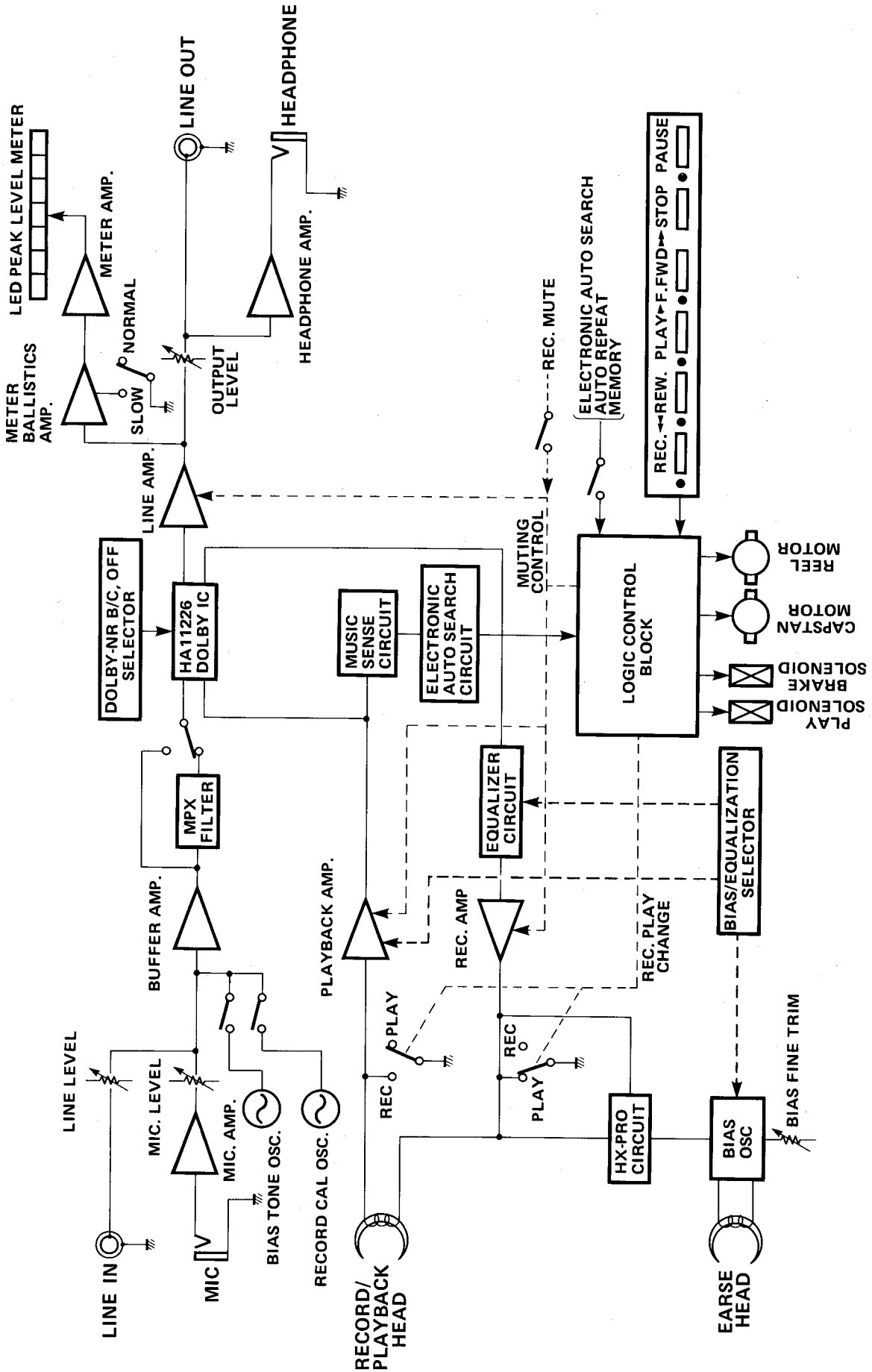


Fig. 13

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

• PLAYBACK MODE

The output of the playback head is amplified by the head amplifier (Q101, Q103, Q105, Q107 and Q109) and input to pin 4 of the Dolby IC. This Dolby IC consists of a single chip which allows the Dolby function to be switched between Dolby B, Dolby C, and off. After the signal has passed through the Dolby IC, it is output from pin 24, further amplified by the line amplifier circuit (Q301, Q303, Q305, and Q307), and passed through the OUTPUT LEVEL control to the OUTPUT terminal. Output to the headphones jack is split off following the OUTPUT LEVEL control and amplified by the headphones amplifier (IC351).

BIAS/EQUALIZATION switching during playback is performed by switching only the equalizer characteristic in the head amplifier.

• RECORD MODE

Input from the microphone jack is amplified by the microphone amplifier (Q151 and Q153); it then passes through the input level control and the record input buffer amplifier (Q501 and Q507) and enters the MPX filter. The MPX filter can be turned on and off by means of the MPX filter switch; the filter is bypassed when the switch is set to off. When input is from the line jacks, the signal passes from the input terminal through the LINE LEVEL control and is combined with the microphone line at the entrance to the record input buffer amplifier mentioned previously. There is no switch in this portion of the circuit, so the line input and microphone input are mixed if both the line level and microphone level controls are raised.

As during playback, the signal enters pin 1 of the Dolby IC (IC501) after leaving the MPX filter. This IC can also be switched between Dolby B, Dolby C, and off for recording. The record signal is output from pin 14 of the IC and proceeds to the record head through the equalizer circuit and the record amplifier (IC201). Bias current from the bias oscillator block, controlled by the BIAS/EQUALIZATION selector switches, is applied to the head through the HX-PRO circuit.

• MUTING

With the record/playback head used in the CD301, the record amplifier output is grounded during playback and the head amplifier output is grounded during recording. This electronic switching is performed automatically by the logic control circuit as the tape control buttons are pressed.

1) PLAYBACK MODE

Muting control signals are output from pins 15 and 16 of the tape deck control IC (IC801) when the PLAY button is pressed. These control signals cause Q751 to turn off Q753 and Q757 (left channel), and Q754 and Q758 (right channel); in other words, they cause the head amplifier and line amplifier signals to be output. Further, Q701, Q703 and Q755 (left channel); and Q702, 704 and Q756 (right channel) are turned on (that is, grounded) by Q707, Q708 and Q710. Q705 (left channel) and Q706 (right channel) are turned off.

2) RECORD MODE

As in the playback mode, muting signals are output from pins 15 and 16 of IC801 to turn off Q753 and Q757 (left channel); Q754 and Q758 (right channel); Q701, Q703 and Q755 (left channel); and Q702, Q704 and Q756 (right channel). Q705 (left channel) and Q706 (right channel) are turned on.

3) RECORD MUTE MODE

When the REC MUTE button on the front panel is pressed, only Q755 (left channel) and Q756 (right channel) go on so that a blank section is recorded.

4) POWER SWITCH ON/OFF and STOP MODE

When the CD301's power switch is switched to its on position, Q753 and Q757 (left channel), and Q754 and Q758 (right channel) are turned on for a few seconds by Q51 and Q52 in the power circuit, regardless of whether the unit is in the PLAYBACK or the RECORD mode. These also go on immediately when the power switch is switched to the off position. Further, these transistors are always on while the unit is in the STOP mode. Thus, no shock noise is output to the OUTPUT terminals whenever the power is turned on or off.

• HX-PRO System

By varying the bias level to compensate for the different characteristics of the input signal, Active Bias is kept constant, so that this allows natural-sounding recordings of the low frequency region. Also, much higher levels of high frequencies can be recorded.

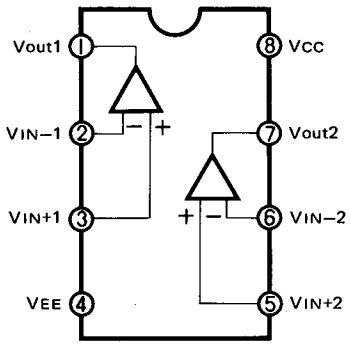
If we consider specific sectors of the frequency range, then, if a signal source only contains high frequency components, the HX-PRO will detect this and reduce the bias from the oscillator to the optimum bias for the signal. On the other hand, no changes in bias level will be made for signal sources that contains only low frequency sounds. However, when low frequency signals contain occasional admixtures of high frequency signals, the HX-PRO will reduce the bias, changing only high frequency bias levels while keeping lower frequency bias level constant. The new system, therefore, not only offers an improvement at high frequencies, but also ensures the optimum bias at low frequencies, too.

Advantages of the HX-PRO

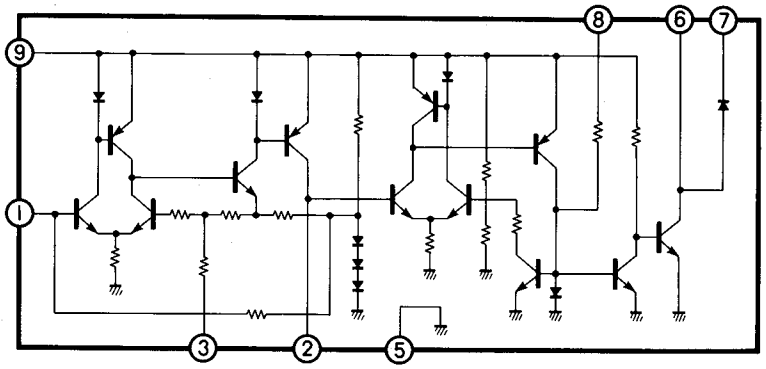
1. Gives performance almost equal to metal tape for normal tape.
2. Outstanding treble dynamic range.
3. Adjustment to left and right channels can be made independently.
4. All kinds of tape from normal through metal are suitable.

IC FUNCTIONAL BLOCK DIAGRAM

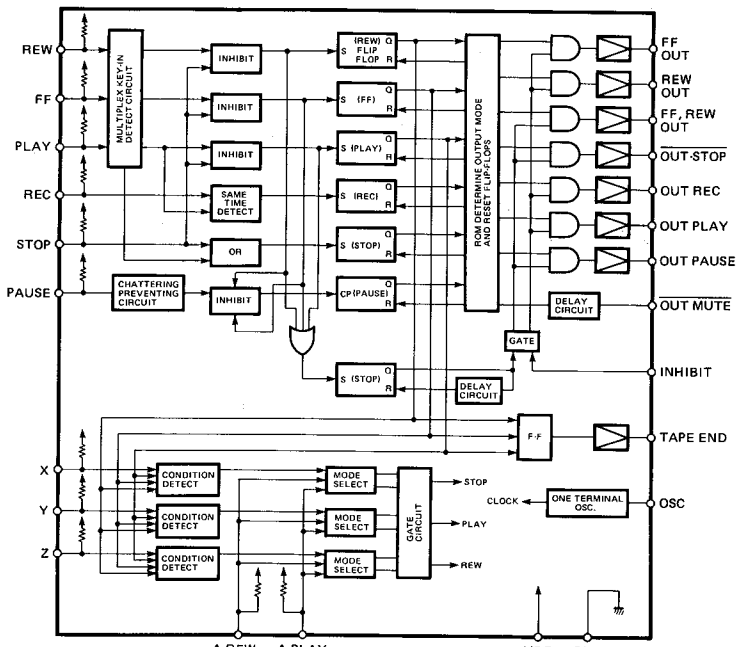
μPC4558C: IC201, 471
NJM4556: IC351
LA6458: IC401, 402
HA17082PS: IC671, 672
NJM4559D: IC673



BA335: IC951

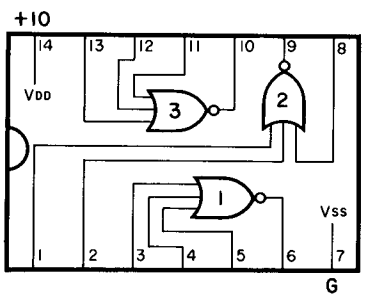


TC9121P: IC801

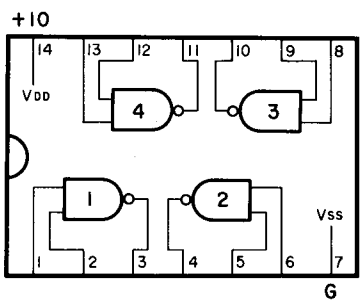


X: Input terminal which orders "stop" or "play" while rewinding. (Set at auto play mode.)
Y: Input terminal which orders "stop" or "rewind" while playing or recording. (Set at auto rewind mode.)
Z: Orders the operation at tape end while auto rewind or auto play.

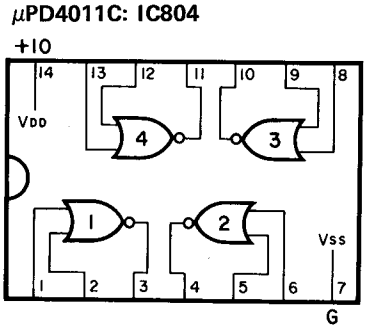
μPD4023C: IC802



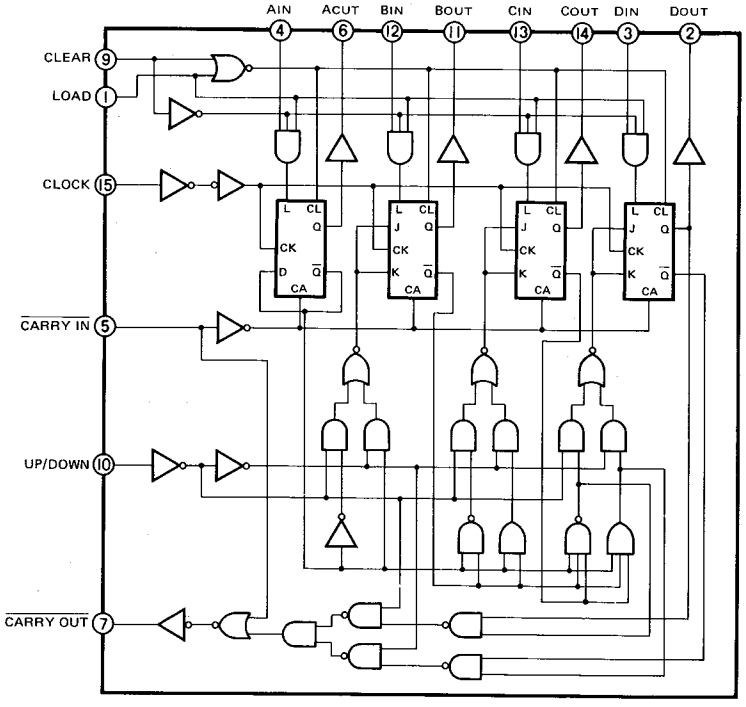
μPD4001C: IC803, 806



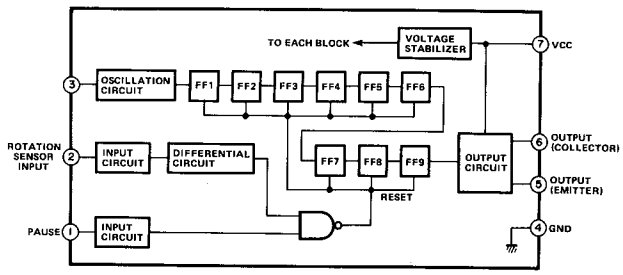
μPD4011C: IC804



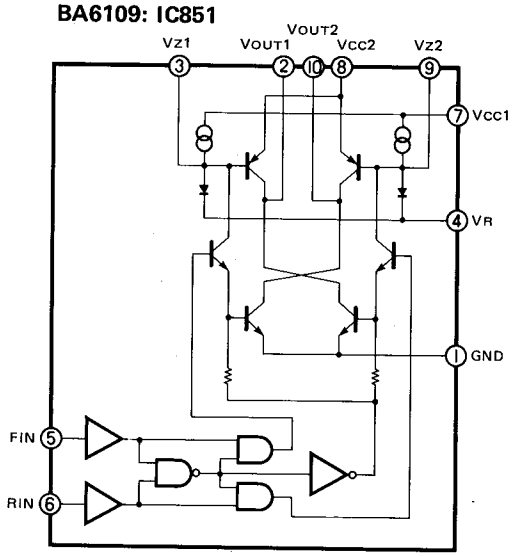
μPD4516C: IC805



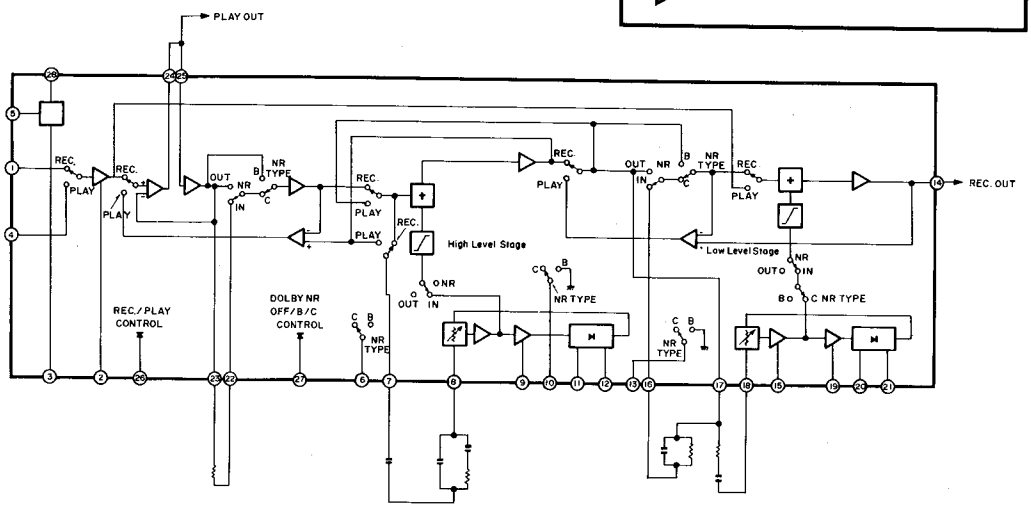
AN6250: IC807



BA6109: IC851

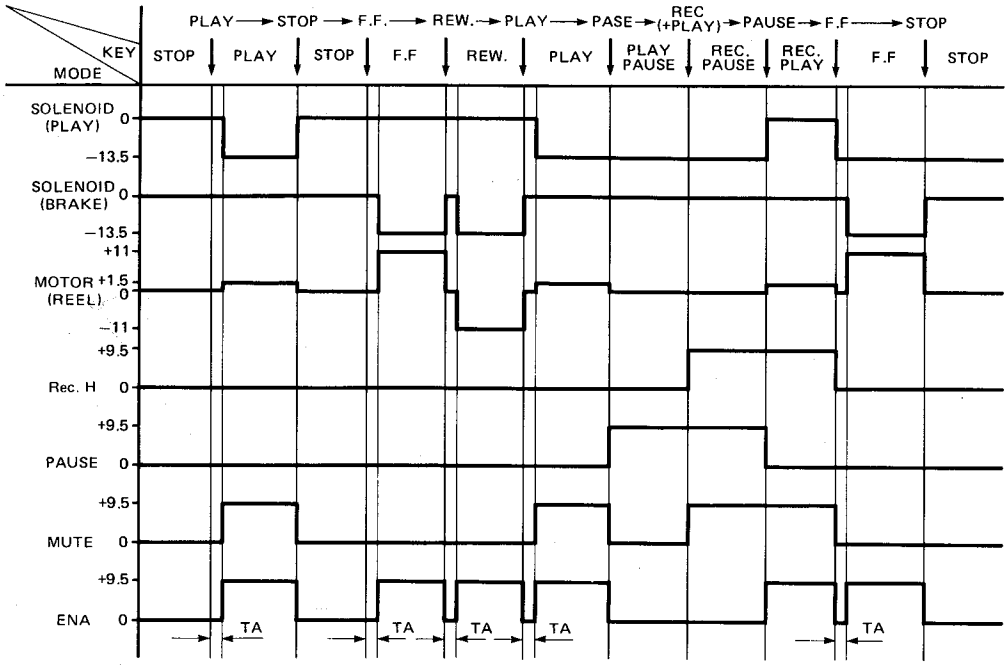


HA12038: IC501, 502



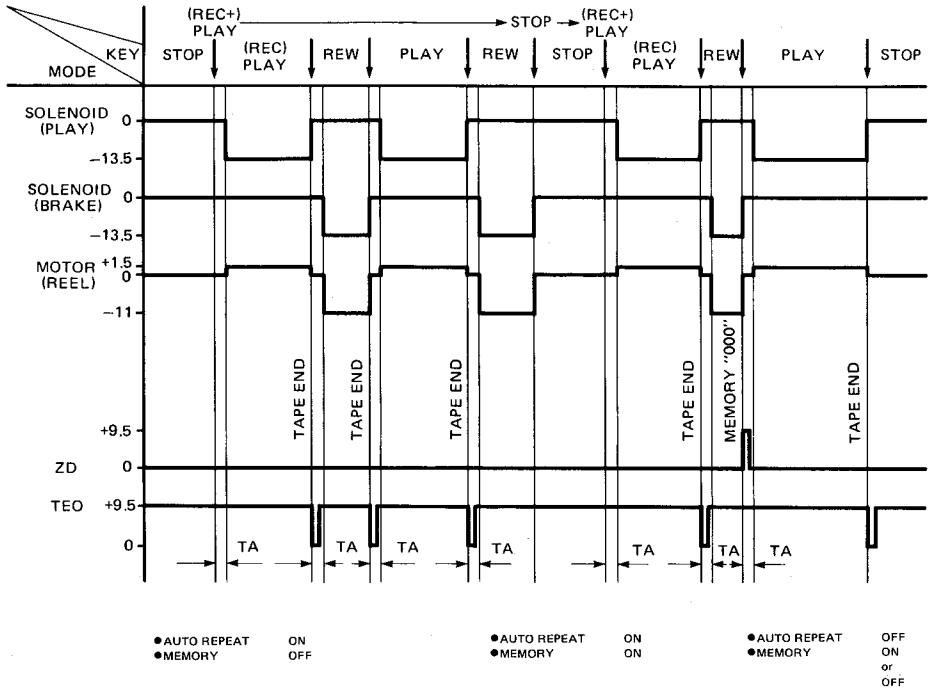
TIMING CHART

No. 1 KEY OPERATION MODE



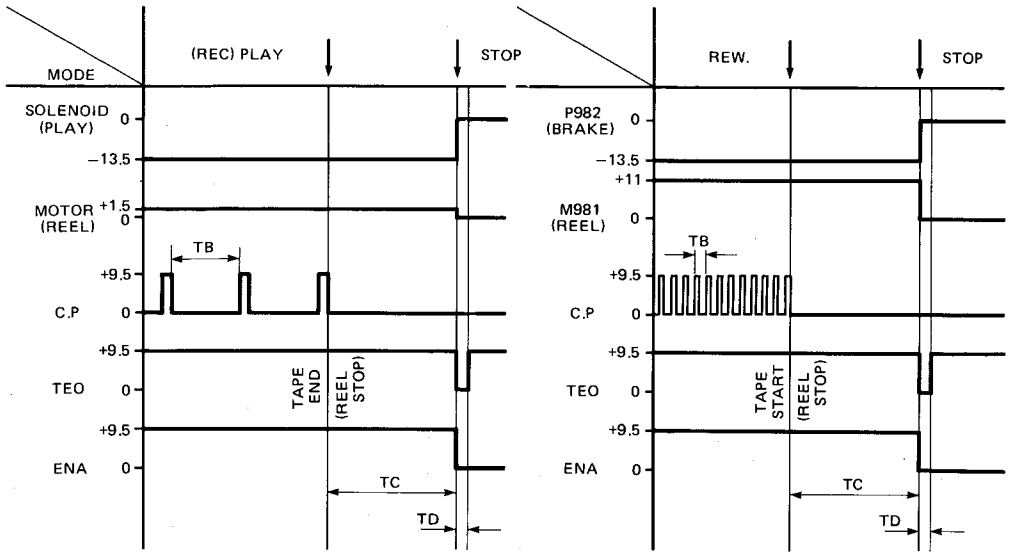
TA = 0.3 sec.

No. 2 AUTO REPEAT

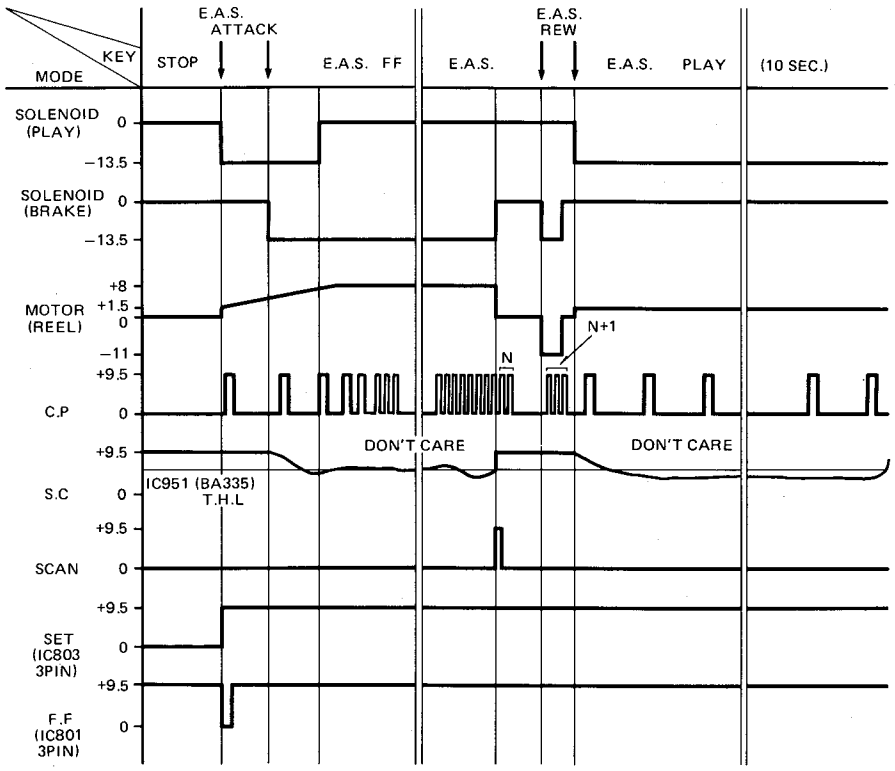


●AUTO REPEAT ●MEMORY	ON OFF	●AUTO REPEAT ●MEMORY	ON ON	●AUTO REPEAT ●MEMORY	OFF ON or OFF

No. 3 AUTO STOP

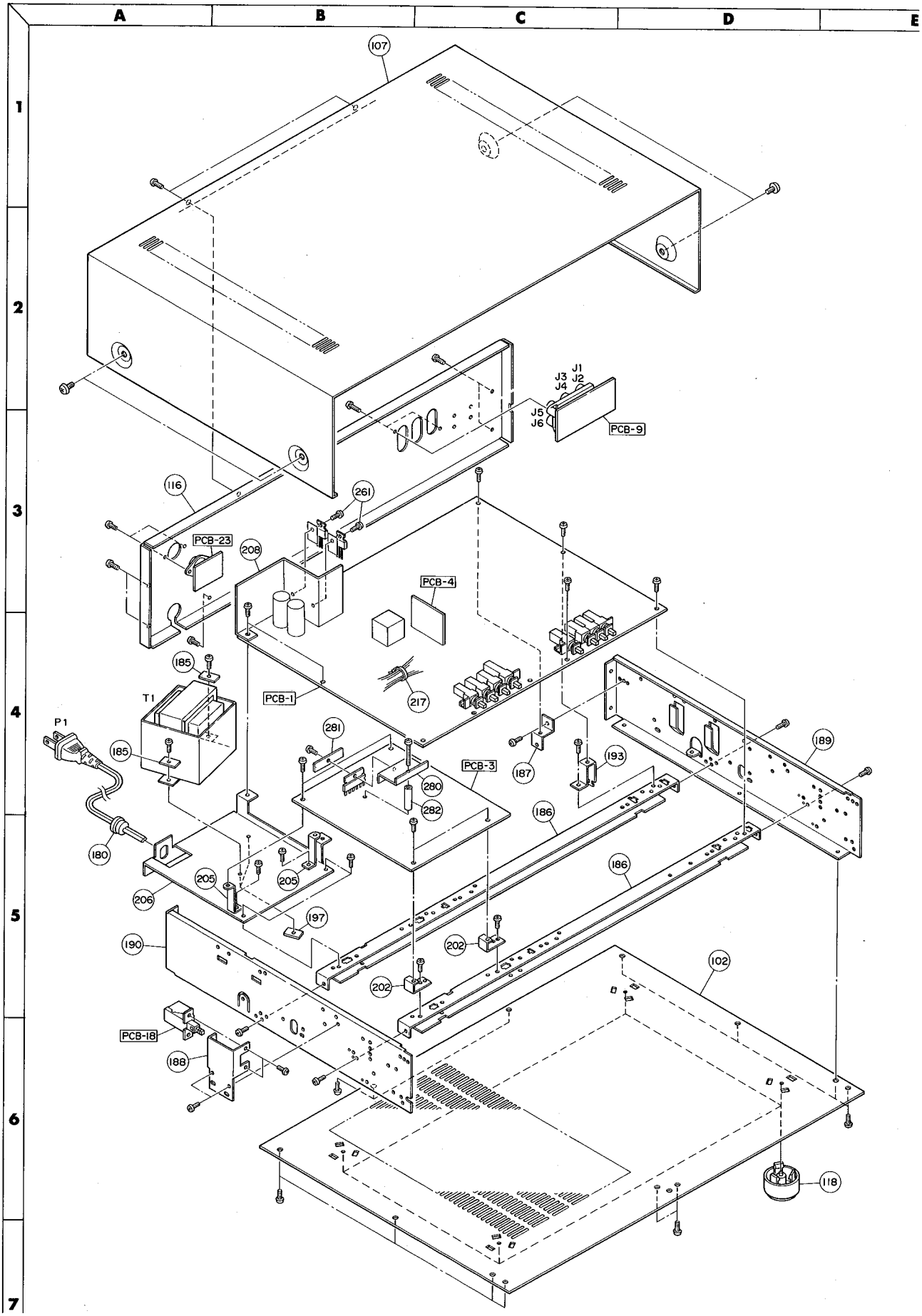


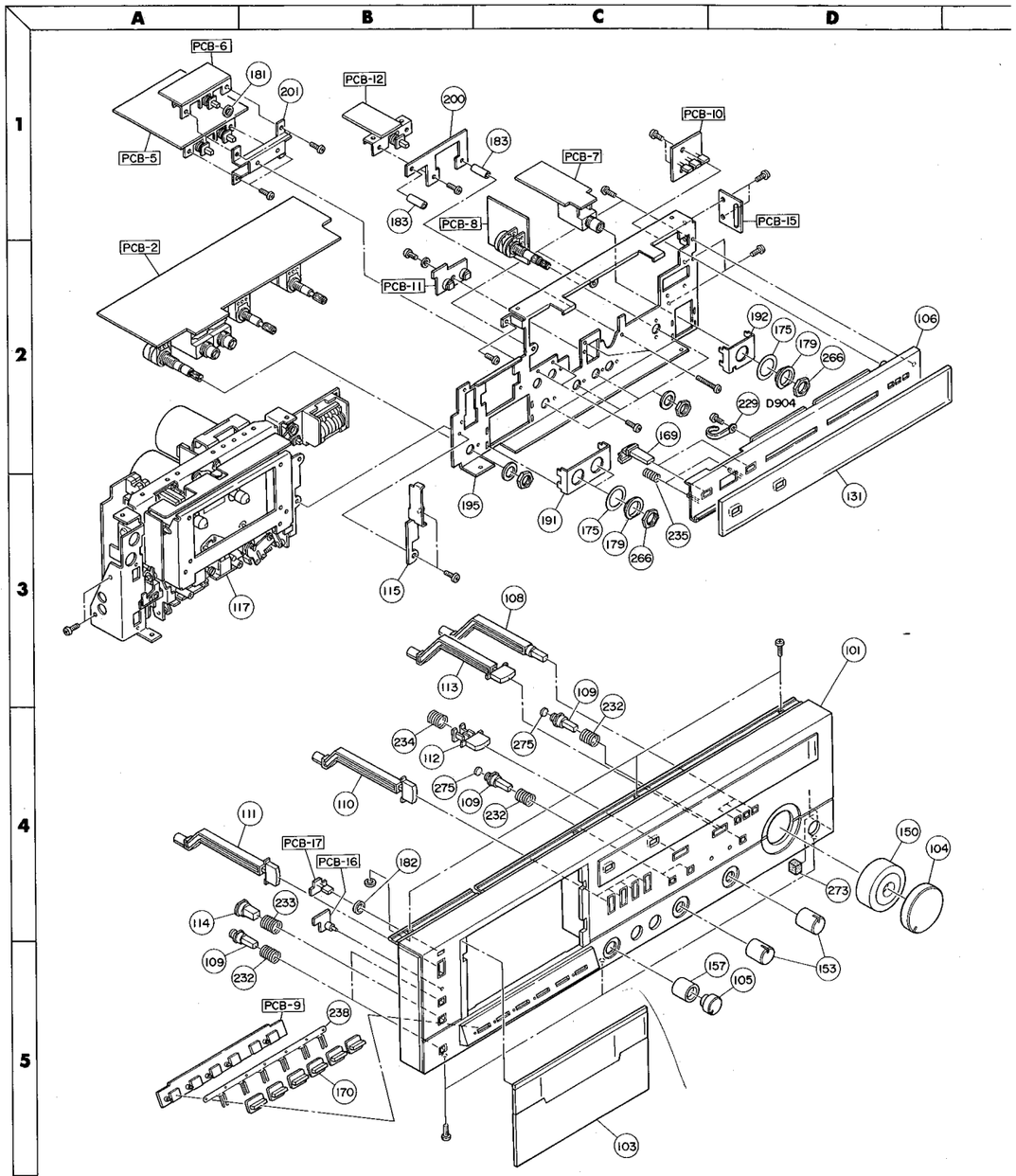
No. 4 E.A.S.



	PLAY	F. F	REW.
TA		0.3 sec.	
TB	200 ~ 600 m sec.	15 ~ 22 m sec.	8.5 ~ 33 m sec.
TC		1.1 ~ 1.6 sec.	
TD		0.37 ~ 0.55 sec.	

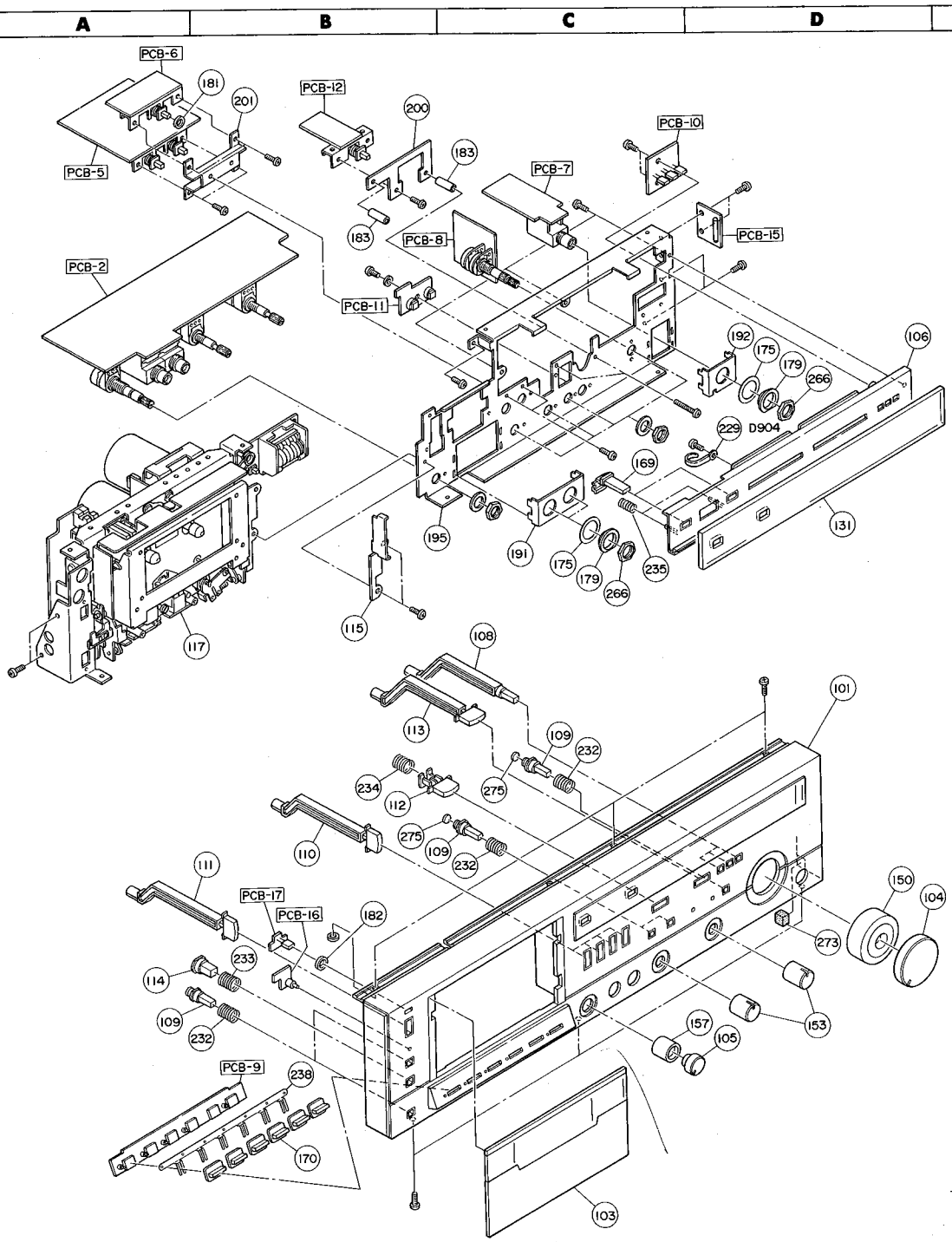
GENERAL UNIT EXPLODED VIEW





GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	A443-CD301A	Front Panel Assembly
102	A423-CD301A	Cabinet Bottom Assembly
103	A452-CD301A	Door Assembly
104	A634-CD301A	Knob Assembly, Line Level (L)
105	A634-CD301B	Knob Assembly, Microphone Level
106	A514-CD301A	Plate Assembly, Meter
107	A414-CD301A	Cabinet Top Assembly
108	A662-CD301A	Push Button Assembly, DOLBY B·C NR type Selector, HX-PRO, MPX filter
109	A662-CD301B	Push Button Assembly, Electronic Auto Search, Rec. Mute, Bias Tone, Record Cal. Tone, Auto Repeat
110	A662-CD301C	Push Button Assembly, Bias/Equalization (METAL, CrO_2, FeCr, LN)
111	A662-CD301G	Push Botton Assembly, Power
112	A662-CD301D	Push Button Assembly, Meter Ballistics
113	A662-CD301E	Push Button Assembly, DOLBY NR
114	A662-CD301F	Push Button Assembly, EJECT
115	B219-CD301A	Bracket Assembly
116	A424-CD301A	Cabinet Back Assembly
117	MR064HF(B)	Cassette, Tape Recorder Mechanical Assembly
118	1319-0139	Foot
131	1441-00203	Clear Panel
150	1630-01801	Knob, Line Level (R)
153	1630-01901	Knob, Bias Fine Trim, Output Level
157	1634-03301	Knob, Microphone Level (R)
169	1662-05801VN	Push Button, Memory, Reset
170	1662-05901VN	Push Button, Record, Rew., Play, F.FWD, Stop, Pause
175	2111-1356	Felt
179	2114-72167	Bushing
180	2114-415027	Bushing
181	2114-01224	Bushing
182	2114-01247	Bushing
183	2132-3007021	Spacer
185	2219-7091	Bracket
186	2219-7648	Bracket
187	2219-7651	Bracket
188	2219-7653	Bracket
189	2219-7654	Bracket
190	2219-7655	Bracket
191	2219-7656	Bracket
192	2219-7657	Bracket
193	2219-7661	Bracket
195	2219-7668	Bracket
197	2219-7093	Bracket
200	2219-7797	Bracket
201	2219-7798	Bracket
202	2219-7800	Bracket
205	2219-7799	Bracket
206	2219-7801	Bracket
208	2222-7131	Heat Sink
217	2240-7120	Holder
229	2218-7001	Holding Bracket
232	2651-210188	Spring
233	2651-210189	Spring
234	2651-210190	Spring
235	2651-210191	Spring
238	2652-00253	Leaf Spring
261	2320-7004	Special Screw (+)
266	2440-6M	Special Nut
273	2112-11248	Sponge
275	2111-1442	Felt
280	2222-5039	Heat Sink
281	2222-5040	Heat Sink
282	2132-01703	Spacer



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106	A514-CD301A	Plate Assembly, Meter
107	A414-CD301A	Cabinet Top Assembly
108	A662-CD301A	Push Button Assembly, DOLBY B·C NR type Selector, HX-PRO, MPX filter

109	A662-CD301B	Push Button Assembly, Electronic Auto Search, Rec. Mute, Bias Tone, Record Cal. Tone, Auto Repeat
110	A662-CD301C	Push Button Assembly, Bias/Equalization (METAL, CrO_2, FeCr, LN)
111	A662-CD301G	Push Botton Assembly, Power
112	A662-CD301D	Push Button Assembly, Meter Ballistics
113	A662-CD301E	Push Button Assembly, DOLBY NR
114	A662-CD301F	Push Button Assembly, EJECT
115	B219-CD301A	Bracket Assembly
116	A424-CD301A	Cabinet Back Assembly
117	MR064HF(B)	Cassette, Tape Recorder Mechanical Assembly
118	1319-0139	Foot
131	1441-00203	Clear Panel
150	1630-01801	Knob, Line Level (R)
153	1630-01901	Knob, Bias Fine Trim, Output Level
157	1634-03301	Knob, Microphone Level (R)
169	1662-05801VN	Push Button, Memory, Reset
170	1662-05901VN	Push Button, Record, Rew., Play, F.FWD, Stop, Pause
175	2111-1356	Felt
179	2114-72167	Bushing
180	2114-415027	Bushing
181	2114-01224	Bushing
182	2114-01247	Bushing
183	2132-3007021	Spacer
185	2219-7091	Bracket
186	2219-7648	Bracket
187	2219-7651	Bracket
188	2219-7653	Bracket
189	2219-7654	Bracket
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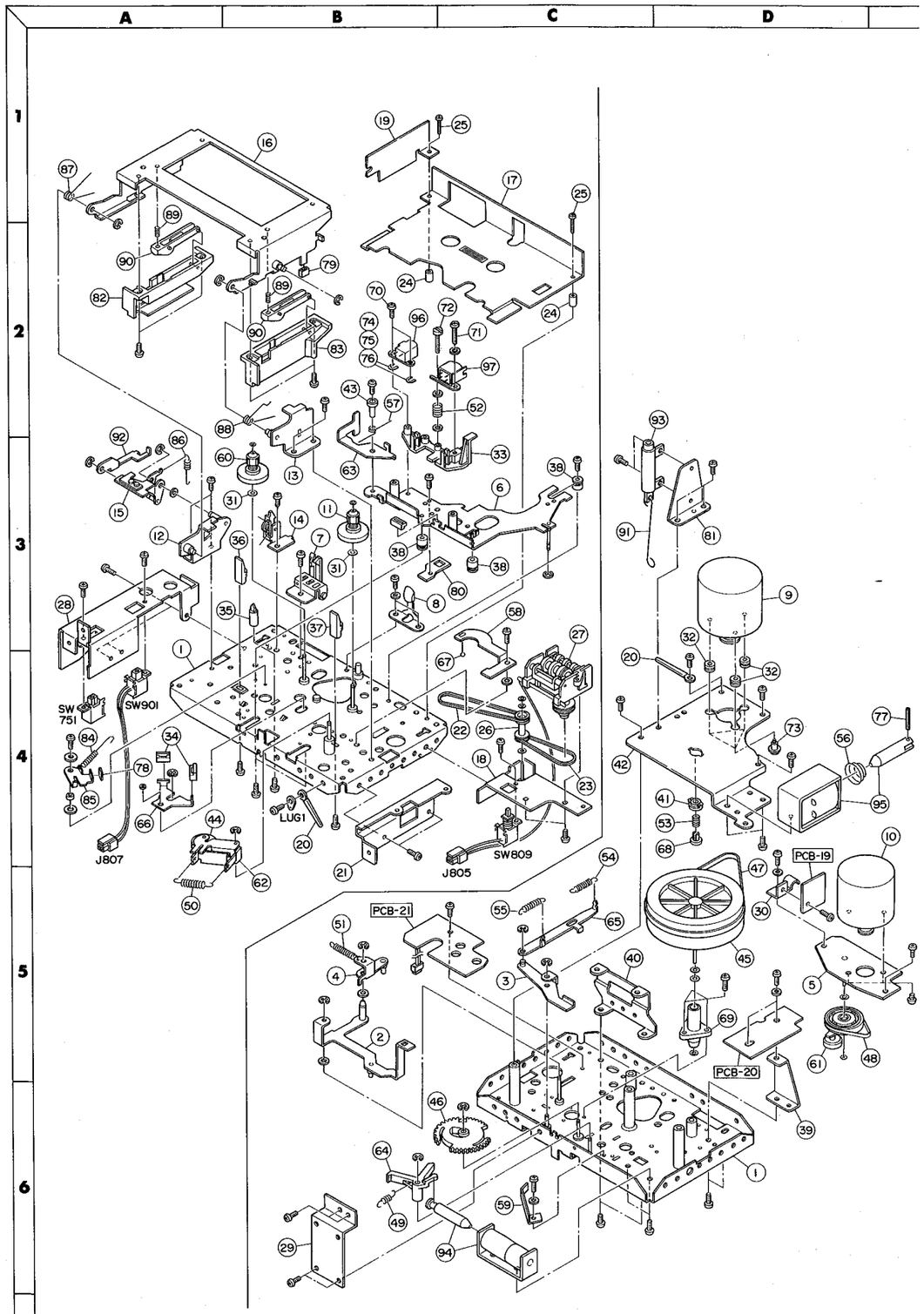
192	2219-7657	Bracket
193	2219-7661	Bracket
195	2219-7668	Bracket
197	2219-7093	Bracket
200	2219-7797	Bracket
201	2219-7798	Bracket
202	2219-7800	Bracket
205	2219-7799	Bracket
206	2219-7801	Bracket
208	2222-7131	Heat Sink
217	2240-7120	Holder
229	2218-7001	Holding Bracket
232	2651-210188	Spring
233	2651-210189	Spring
234	2651-210190	Spring
235	2651-210191	Spring
238	2652-00253	Leaf Spring
261	2320-7004	Special Screw (+)
266	2440-6M	Special Nut
273	2112-11248	Sponge
275	2111-1442	Felt
280	2222-5039	Heat Sink
281	2222-5040	Heat Sink
282	2132-01703	Spacer

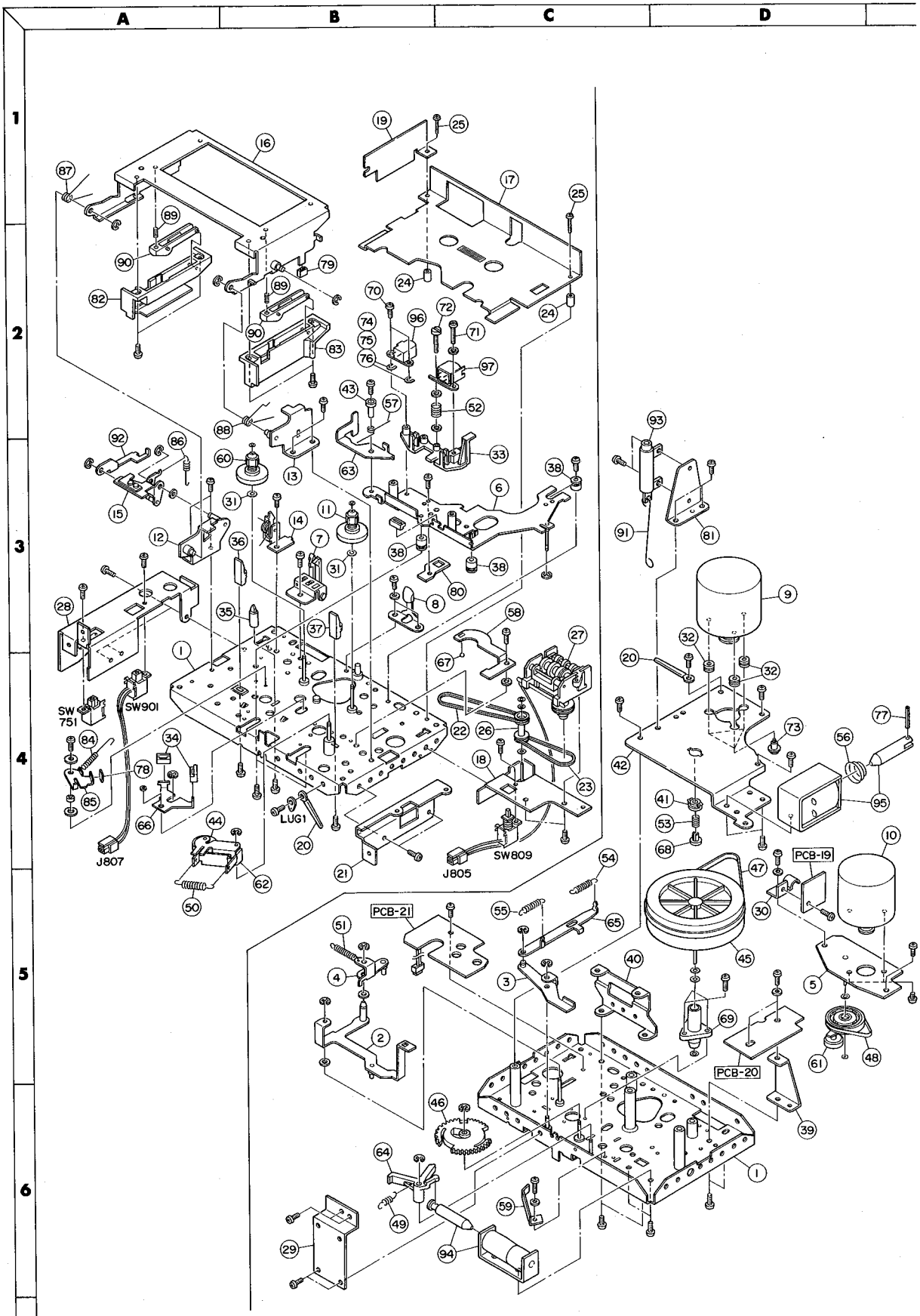
CASSETTE MECHANISM EXPLODED VIEW



CASSETTE MECHANISM PARTS LIST

Ref. No.	Parts No.	Description
1	B211-MR064HFA	Chassis Assembly
2	B672-MR064HFA	Lever Assembly, Brake
3	B672-MR064HFB	Lever Assembly, Play Main
4	B672-MR064HFC	Lever Assembly, Cue
5	B251-MR064HFA	Bracket Assembly, Motor
6	B674-MR064HFA	Slider Assembly
7	B219-MR064HFA	Bracket Assembly
8	B652-MR064HFA	Leaf Spring
9	D311-MR064HFA	DC Motor Assembly, Main
10	D311-MR064HFB	DC Motor Assembly, Sub
11	B661-MR064HFB	Take-Up Reel Spindle Assembly
12	B219-MR064HFB	Bracket Assembly, Lid Left
13	B219-MR064HFC	Bracket Assembly, Lid Right
14	B219-MR064HFD	Bracket Assembly, Lid Lock Lever
15	B672-MR064HFD	Lever Assembly, Eject
16	A614-MR064HFA	Lid Assembly
17	A514-CD301MA	Dressing Plate Assembly (Includes: Lamp)
18	B219-CD301MA	Bracket Assembly
19	1514-05601	Plate
20	2218-7001	Holding Bracket
21	2219-7667	Bracket
22	2642-01445	Belt
23	2642-01448	Belt
24	2363-501712	Bushing
25	2310-5010	Special Screw(—)
26	2617-5147	Wheel
27	3131-455006	Counter
28	2219-7662	Bracket
29	2219-7802	Bracket
30	2222-7133	Heat Sink
31	2111-1357	Felt
32	2114-18	Bushing
33	2132-5092	Spacer
34	2135-5004	Brake Shoe
35	2142-5005	Guide
36	2142-5006	Guide
37	2142-5011	Guide
38	2142-5013	Guide
39	2218-5017	Holding Bracket
40	2219-5614	Bracket
41	2240-5090	Holder
42	2251-5046	Bracket, Motor
43	2363-55150	Boss
44	2614-5030	Pinch Roller
45	2617-5163	Flywheel
46	2622-5036	Gear
47	2642-02418	Belt
48	2642-02415	Belt
49	2651-1103452	Spring
50	2651-1103453	Spring
51	2651-1103411	Spring
52	2651-210146	Spring
53	2651-210164	Spring
54	2651-1103455	Spring
55	2651-1103454	Spring
56	2651-222010	Spring
57	2651-5169	Spring
58	2652-5165	Leaf Spring
59	2652-5163	Leaf Spring
60	2661-415032	Supply Reel Spindle

CASSETTE MECHANISM EXPLODED VIEW



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CASSETTE MECHANISM PARTS LIST

Ref. No.	Parts No.	Description
1	B211-MR064HFA	Chassis Assembly
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6	B674-MR064HFA	Slider Assembly
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20	2218-7001	Holding Bracket
21	2219-7667	Bracket
22	2642-01445	Belt
23	2642-01448	Belt
24	2363-501712	Bushing
25	2310-5010	Special Screw(−)
26	2617-5147	Wheel
27	3131-455006	Counter
28	2219-7662	Bracket
29	2219-7802	Bracket
30	2222-7133	Heat Sink
31	2111-1357	Felt
32	2114-18	Bushing
33	2132-5092	Spacer
34	2135-5004	Brake Shoe
35	2142-5005	Guide
36	2142-5006	Guide
37	2142-5011	Guide
38	2142-5013	Guide
39	2218-5017	Holding Bracket
40	2219-5614	Bracket
41	2240-5090	Holder
42	2251-5046	Bracket, Motor
43	2363-55150	Boss
44	2614-5030	Pinch Roller
45	2617-5163	Flywheel
46	2622-5036	Gear
47	2642-02418	Belt
48	2642-02415	Belt
49	2651-1103452	Spring
50	2651-1103453	Spring
51	2651-1103411	Spring
52	2651-210146	Spring
53	2651-210164	Spring
54	2651-1103455	Spring
55	2651-1103454	Spring
56	2651-222010	Spring
57	2651-5169	Spring
58	2652-5165	Leaf Spring
59	2652-5163	Leaf Spring
60	2661-415032	Supply Reel Spindle

Ref. No.	Parts No.	Description
61	2662-5020	Clutch
62	2672-5305	Lever
63	2672-5350	Lever
64	2672-5352	Lever
65	2674-5271	Slider
66	2677-5007	Brake
67	2711-002021	Steel Ball
68	2712-5020	Bearing
69	2712-5026	Bearing
70	2310-5009	Special Screw(—)
71	2310-5010	Special Screw(—)
72	2310-5012	Special Screw(—)
73	2310-5019	Special Screw(—)
74	2410-5017	Special Washer } Head Height Adjustment
75	2410-5018	Special Washer
76	2410-5019	Special Washer
77	2425-3016722	Spring Pin
78	2111-11464	Felt
79	2114-415090	Bushing
80	2219-5648	Bracket
81	2219-5672	Bracket
82	2240-5139	Holder
83	2240-5140	Holder
84	2651-1101405	Spring
85	2672-5312	Lever
86	2651-1101409	Spring
87	2651-5155	Spring
88	2651-5157	Spring
89	2651-2101411	Spring
90	2672-5311	Lever
91	2673-5028	Link
92	2674-5190	Slider
93	2692-3	Damper
94	4333-40216	DC Solenoid
95	4333-40514	DC Solenoid
96	5873-1217	Erase Head
97	5874-1320	Record/Playback Head

ELECTRICAL PARTS LIST

Ref. No.	Parts No.	Description
	CHASSIS MISCELLANEOUS	
P1	4161-0487	AC Line Cord
T1	5584-701369	Power Transformer
PL2	5731-1407123	Lamp, Cassette Illumination
CO1	4443-712	Connector, AC Line Cord
D904	5623-LT1043	LED Display, Peak Level Meter
SW751, 801	4431-01027195	Push Switch, Rec. Mute, Electronic Auto Search
SW809	4431-01027169	Push Switch, Memory
J153	4163-73253	Connector with Lead Wire, 3-Pin
J181, 803	4163-71853	Connector with Lead Wire, 3-Pin
J182	4163-73753	Connector with Lead Wire, 3-Pin
J201	4163-73353	Connector with Lead Wire, 3-Pin
J202	4163-73853	Connector with Lead Wire, 3-Pin
J401	4163-73453	Connector with Lead Wire, 3-Pin
J405	4163-73653	Connector with Lead Wire, 5-Pin
J471, 805	4163-71053	Connector with Lead Wire, 2-Pin
J472	4163-73553	Connector with Lead Wire, 3-Pin
J473	4163-75053	Connector with Lead Wire, 6-Pin
J701	4163-042501	Connector with Lead Wire, 4-Pin
J702	4163-061301	Connector with Lead Wire, 6-Pin
J751	4163-101301	Connector,with Lead Wire, 10-Pin
J801	4163-73953	Connector with Lead Wire, 6-Pin
J802	4163-74053	Connector with Lead Wire, 7-Pin
J804	4163-70353	Connector with Lead Wire, 3-Pin
J806	4163-70453	Connector with Lead Wire, 2-Pin
J807	4163-70553	Connector with Lead Wire, 2-Pin
J808	4163-70453	Connector with Lead Wire, 2-Pin
J809	4163-70181	Connector with Lead Wire, 9-Pin
J901, J904	4163-70165	Connector with Lead Wire, 7-Pin
JM801	4242-082702	Jumper Lead, 8-Wire
LUG1	4211-4	Lug Terminal
	PCB-1 MAIN P. C. BOARD	
	RESISTORS	
R19	5102-2204713	22Ω, ±2%, 1/4W, Fuse
R20	5102-8204713	82Ω, ±2%, 1/4W, Fuse
R111, 112, 117, 118	5174-822381	8.2kΩ, ±1%, 1/4W, Metal
R113, 114	5174-133381	13kΩ, ±1%, 1/4W, Metal
R235, 236	5102-2714715	270Ω, ±2%, 1/4W, Fuse
R256	5102-4R74715	4.7Ω, ±2%, 1/4W, Fuse
R525, 526	5174-512381	5.1kΩ, ±1%, 1/4W, Metal
R527, 528	5174-153381	15kΩ, ±1%, 1/4W, Metal
R533, 534, 553, 554	5174-622381	6.2kΩ, ±1%, 1/4W, Metal
R571, 572	5102-1014715	100Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR101, 102	5101-2238575	22kΩB
VR203, 204, 205, 207, 208, 209, 210, 251, 252, 253	5101-10371920	10kΩB
VR671. 672	5101-5037189	50kΩB
	CAPACITORS	
C4, 5	5345-228D041	2200μF, ±20%, 25V, Electrolytic
C8. 9	5345-108C041	1000μF, ±20%, 16V, Electrolytic
C10, 11	5345-226C041	22μF, ±20%, 16V, Electrolytic
C51	5345-106F041	10μF, ±20%, 50V, Electrolytic
C52	5345-226D0211	22μF, ±20%, 25V, Electrolytic
C53	5345-227D041	220μF, ±20%, 25V, Electrolytic
C101, 102, 217, 218	5359-3315851	330pF, ±5%, 25V, Electrolytic
C103, 104	5345-226C0226	22μF, ±20%, 16V, Electrolytic
C105, 106	5345-227A0951	220μF, ±20%, 6.3V, Electrolytic
C107, 108, 109, 110, 549, 550	5359-332771	0.0033μF, ±2%, 50V, Polypropylene

Ref. No.	Part No.	Description
C111, 112, 505, 506, 517, 518, 531, 532, 565, 566	5345-106C0951	10μF, ±20%, 16V, Electrolytic
C113, 114, 219, 110, 511, 512, 519, 520	5345-107C041	100μF, ±20%, 16V, Electrolytic
C207, 208, 958	5345-224F0951	0.22μF, ±20%, 50V, Electrolytic
C209, 210, 251, 282	5345-476C041	47μF, ±20%, 16V, Electrolytic
C213, 214	5352-684571	0.68μF, ±5%, 50V, Metal
C215, 216	5345-225F0951	2.2μF, ±20%, 50V, Electrolytic
C501, 502, 503, 504	5345-105F0951	1μF, ±20%, 50V, Electrolytic
C513, 514, 703	5345-227C041	220μF, ±20%, 16V, Electrolytic
C515, 516, 553, 554, 567, 568	5345-106C041	10μF, ±20%, 16V, Electrolytic
C523, 524	5345-226-16	22μF, +50% −10%, 16V, Electrolytic
C525, 526, 527, 528	5359-153771	0.015μF, ±2%, 50V, Polypropylene
C535, 536, 559, 560	5345-475-25	4.7μF, +50% −10%, 25V, Electrolytic
C537, 538, 539, 540, 561, 562	5345-154F0951	0.15μF, ±20%, 50V, Electrolytic
C541, 542, 543, 544, 563, 564	5345-474F0951	0.47μF, ±20%, 50V, Electrolytic
C551, 552	5359-392771	0.0039μF, ±2%, 50V, Polypropylene
C581	5345-477C041	470μF, +50% −10%, 16V, Electrolytic
C751	5345-105F0211	1μF, ±20%, 50V, Electrolytic
C752	5345-106C0211	10μF, ±20%, 16V, Electrolytic
C953	5345-104F0211	0.1μF, ±20%, 50V, Electrolytic
C954	6345-476-16	47μF, +50% −10%, 16V, Electrolytic
C959	5345-106-16	10μF, +50% −10%, 16V, Electrolytic
C960	5345-105-50	1μF, +75% −10%, 50V Electrolytic
	INTEGRATED CIRCUIT	
IC201	5652-μPC4558C	μPC4558C
IC501, 502	5652-HA12038	HA12038
IC951	5654-BA335	BA335
	TRANSISTORS	
Q1	5612-855(C)	2SB855(C)
Q2, 501, 502, 503, 504 505, 506, 581, 582, 675, 676, 705, 706, 708, 710, 716	5613-2603(F)	2SC2603(F)
Q3	5613-1419(C)	2SC1419(C)
Q4, 707	5611-1115(F)	2SA1115(F)
Q51, 751, 759	5611-1115(F)or(E)	2SA1115(F) or 2SA1115(E)
Q101, 102	5611-1190(E)	2SA1190(E)
Q103, 104	5613-2855(E)or(D)	2SC2855(E) or 2SC2855(D)
Q105, 106	5613-2320L(F)	2SC2320L(F)
Q107, 108	5611-999(F)	2SA999(F)
Q109, 110, 252, 753, 754, 951	5613-2603(F)or(E)	2SC2603(F) or 2SC2603(E)
Q251	5614-667(C)	2SD667(C)
Q507, 508	5611-999L(F)	2SA999L(F)
Q673, 674	5616-2SK163(M)	2SK163(M)
Q701, 702, 703, 704	5613-1890(E)	2SC1890(E)
Q717	5612-647(C)	2SB647(C)
Q755, 756	5613-2878(B)	2SC2878(B)
	DIODES	
D1	5685-1F	Bridge Silicon, S1WB10
D2, 5, 51, 52, 53, 54, 55, 56, 251, 252, 253, 254, 675, 701, 702, 703, 751, 752, 755, 756, 757, 951, 952, 953	5631-1S2473	1S2473
D3, 4	5635-RD9R1EB2	Zener, RD9.1EB2
D101, 102	5641-MV11	Varistor, MV11

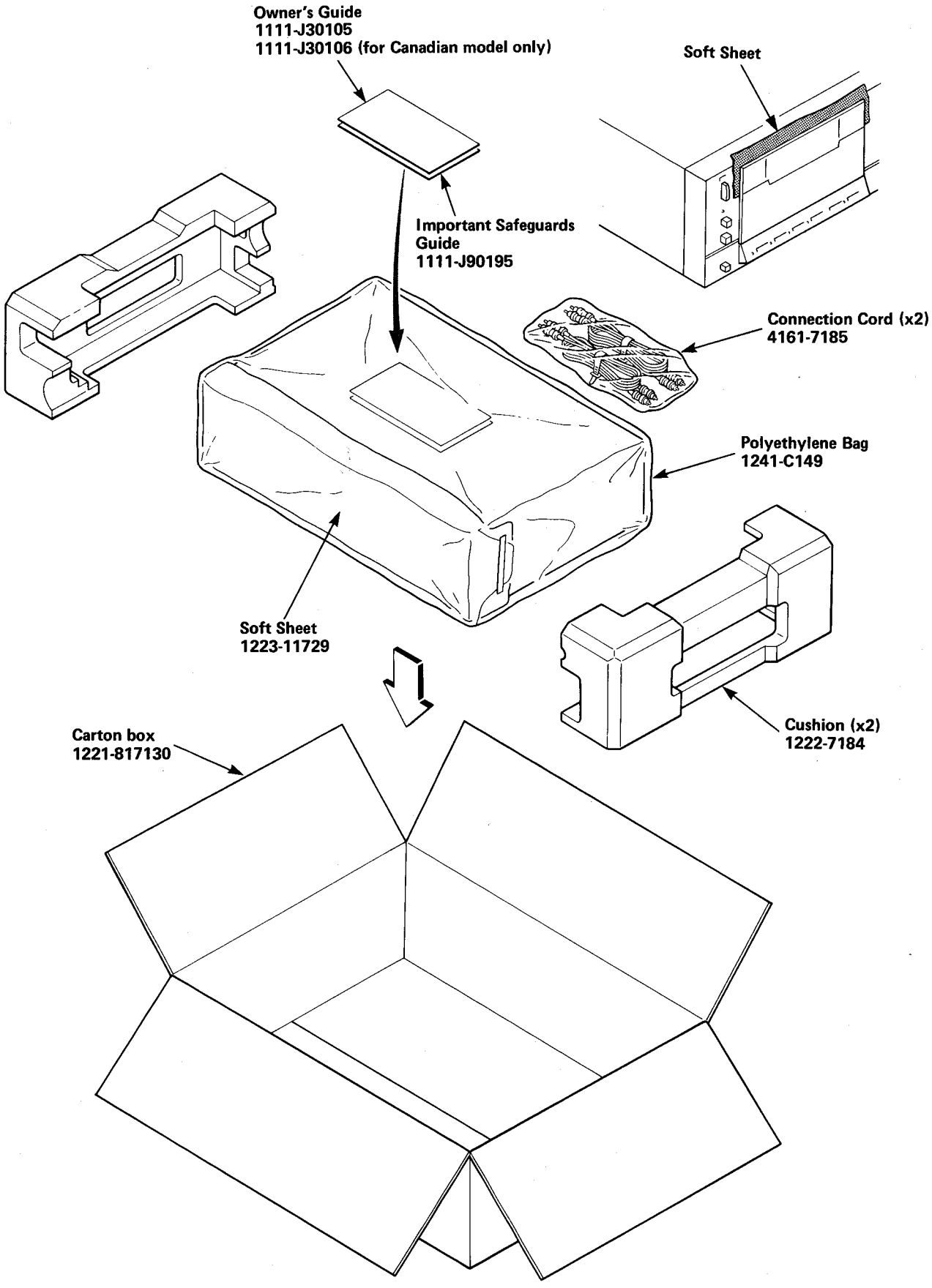
Ref. No.	Part No.	Description
D581, 582	5635-HZ12AL	Zener, HZ12AL
D583	5635-RD4R7EB2	Zener, RD4.7EB2
D759	5635-RD6R8EB2	Zener, RD6.8EB2
	COILS	
L201, 202	5933-70316	3.9mH
L203, 204	5932-70115	
L205, 206	5932-70116	
L251	5995-101325	
L501, 502	5995-363156	
LC501, 502	5214-28	LC Components
	MISCELLANEOUS	
OS101	6171-0801	Complex, OSC.
SW251, 252, 253, 254	4431-04187257	Push Switch, Bias/Equalization Selector (LN, FeCr, CrO_2, Metal)
SW501, 502, 503, 504	4431-04087657	Push Switch, Dolby NR, NR Type, HX-PRO, MPX Filter
P201, 202	4443-030158	Connector, 3-Pin
P701	4443-040177	Connector, 4-Pin
P702	4443-060177	Connector, 6-Pin
P751	4443-100177	Connector, 10-Pin
JM201	4242-030012	Jumper Lead, 3-Wire
	PCB-2 MIC. AND LINE AMP. P.C. BOARD	
	RESISTORS	
R435, 436	5102-1214715	120Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR151, 152	5113-2037482	20kΩA, Microphones Level
VR254	5113-2027821	2kΩB, Bias Fine Trim
VR301, 302	5113-5027F40	5kΩA, Output Level
VR401, 402	5101-20371920	20kΩB
	CAPACITORS	
C151, 152, 159, 160	5345-106C0212	10μF, ±20%, 16V, Electrolytic
C155, 156	5345-107B041	100μF, ±20%, 10V, Electrolytic
C161, 162	5345-476C041	47μF, ±20%, 16V, Electrolytic
C307, 308	5342-226C0951	22μF, ±20%, 16V, Electrolytic
C361, 409, 410	5345-226C041	22μF, ±20%, 16V, Electrolytic
C401, 402	5345-105-50	1μF, +75% −10%, 50V, Electrolytic
C403, 404	5345-475-25	4.7μF, +50% −10%, 25V, Electrolytic
C407, 408	5345-225F0211	2.2μF, ±20%, 50V, Electrolytic
C421, 422	5345-224F0212	0.22μF, ±20%, 50V, Electrolytic
C423, 424	5345-106-16	10μF, +50% −10%, 16V, Electrolytic
	INTEGRATED CIRCUIT	
IC401, 402	5652-LA6458	LA6458
	TRANSISTORS	
Q151, 152	5613-2320L(F)	2SC2320L(F)
Q153, 154	5611-999L(F)	2SA999L(F)
Q301, 302	5616-170(GR)	2SK170(GR)
Q303, 304	5615-74(GR)	2SJ74(GR)
Q305, 306	5611-984(F)	2SA984(F)
Q307, 308	5613-2274(F)	2SC2274(F)
Q351	5613-2603(F)or(E)	2SC2603(F) or 2SC2603(E)
Q421, 422, 423, 424	5613-2320(D)or(E)	2SC2320(D) or 2SC2320(E)
Q757, 758	5613-2878(B)	2SC2878(B)
	DIODES	
D401, 402	5631-1K34A	1K34A
D421, 422, 753, 754	5631-1S2473	1S2473
	MISCELLANEOUS	
J151, 152	4551-00106	Jack, Microphones
P401	4443-030158	Connector, 3-Pin
JM401	4242-030012	Jumper Lead, 3-Wire

Ref. No.	Part No.	Description
	PCB-3 LOGIC CONTROL P. C. BOARD	
	RESISTORS	
R816, 859	5102-1004713	10Ω, ±2%, 1/4W, Fuse
R860	5102-1004715	10Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR851	5101-50171920	500Ω
	CAPACITORS	
C808	5345-684F-0212	0.68μF, ±20%, 50V, Electrolytic
C809	5345-106-16	10μF, +50% −10%, 16V, Electrolytic
C811	5345-476C0212	47μF, ±20%, 16V, Electrolytic
C812	5345-107C041	100μF, ±20%, 16V, Electrolytic
C813, 815	5345-226-16	22μF, +50% −10%, 16V, Electrolytic
C818	5345-474-50	0.47μF, +75% −10%, 50V, Electrolytic
	INTEGRATED CIRCUIT	
IC801	5654-TC9121P	TC9121P
IC802	5654-μPD4023C	μPD4023C
IC803, 806	5654-μPD4001C	μPD4001C
IC804	5654-μPD4011C	μPD4011C
IC805	5654-μPD4516C	μPD4516C
IC807	5654-AN6250	AN6250
IC851	5653-BA6109	BA6109
	TRANSISTOR	
Q801, 856, 859	5613-2236(Y)	2SC2236(Y)
Q803, 805, 808, 809, 855, 858	5611-1115(E)or(F)	2SA1115(E) or 2SA1115(F)
Q804, 806, 807, 852, 853, 854, 857	5613-2603(E)or(F)	2SC2603(E) or 2SC2603(F)
	DIODES	
D801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832	5631-1S2473	1S2473
D851, 852	5635-RD10EB2	Zener, RD10EB2
	MISCELLANEOUS	
P801	4443-060158	Connector, 6-Pin
P802	4443-070158	Connector, 7-Pin
P803, 804	4443-030158	Connector, 3-Pin
P805, 806, 807, 808	4443-020158	Connector, 2-Pin
P809	4443-090177	Connector, 9-Pin
	PCB-4 HX-PRO P. C. BOARD	
	RESISTORS	
R687, 688	5102-1004715	10Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR671, 672	5101-20371920	20kΩB
	CAPACITORS	
C685, 686	5345-476C041	47μF, ±20%, 16V, Electrolytic
	INTEGRATED CIRCUIT	
IC671, 672	5652-HA17082PS	HA17082PS
IC673	5652-NJM4559D	NJM4559D
	TRANSISTORS	
Q671, 672	5614-667(C)	2SD667(C)
	DIODES	
D671, 672, 673, 674	5631-1S2473	1S2473

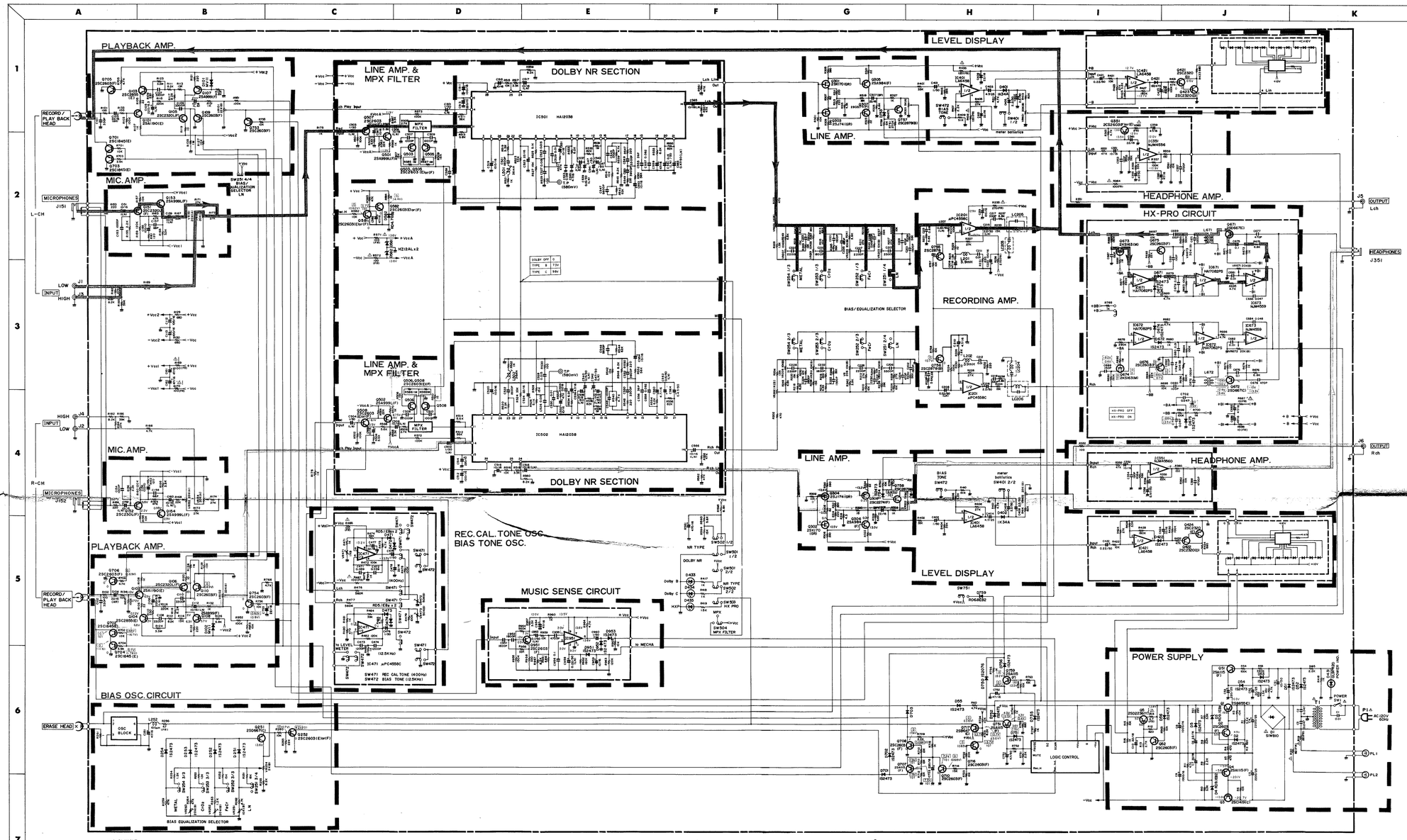
Ref. No.	Part No.	Description
	COILS	
L671, 672	5933-70223	
	MISCELLANEOUS	
P671	4443-117167	Connector, 11-Pin
	PCB-5 BIAS AND RECORD CAL. TONE P.C. BOARD	
	RESISTORS	
R486, 487	5102-1014713	100Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR471	5101-10271920	1kΩB
VR472, 473	5101-50371920	50kΩB
	CAPACITORS	
C475, 476	5345-105-50	1μF, +75% −10%, 50V, Electrolytic
C477, 478	5345-226C041	22μF, ±20%, 16V, Electrolytic
	INTEGRATED CIRCUIT	
IC471	5652-μPC4558C	μPC4558C
	DIODES	
D471, 472, 473, 474	5635-RD5R1EB2	Zener, RD5.1EB2
	MISCELLANEOUS	
SW471, 472	4431-02127559	Push Switch, Bias Tone, Rec. Cal. Tone
P471	4443-020158	Connector, 2-Pin
P472	4443-030171	Connector, 3-Pin
P473	4443-060171	Connector, 6-Pin
	PCB-6 METER BALLISTICS P.C. Board	
	RESISTOR	
R14	5102-4R74715	4.7Ω, ±2%, 1/4W, Fuse
	CAPACITORS	
C6, 7	5345-226C041	22μF, ±20%, 16V, Electrolytic
C405, 406	5345-225F0211	2.2μF, ±20%, 50V, Electrolytic
	TRANSISTORS	
Q5	5613-2236(Y)	2SC2236(Y)
Q52	5613-2603(F)or(E)	2SC2603(F) or 2SC2603(E)
	DIODE	
D56	5631-1S2473	1S2473
	MISCELLANEOUS	
SW401	4431-01028194	Push Switch, Meter Ballistics
P405	4443-050171	Connector, 5-Pin
	PCB-7 HEADPHONE JACK P. C. BOARD	
	RESISTORS	
R363, 364	5102-1014715	100Ω, ±2%, 1/4W, Fuse
	CAPACITORS	
C351, 352	5345-106-16	10μF, +50% −10%, 16V, Electrolytic
C355, 356	5345-474-50	0.47μF, +75% −10%, 50V, Electrolytic
C359, 360	5345-476C041	47μF, ±20%, 16V, Electrolytic
	INTEGRATED CIRCUIT	
IC351	5652-NJM4556	NJM4556
	MISCELLANEOUS	
J351	4451-00107	Jack, Headphones
	PCB-8 LINE LEVEL CONTROL P. C. BOARD	
	RESISTORS	
R169, 170	5102-1014715	100Ω, ±2%, 1/4W, Fuse
	CONTROLS	
VR153, 154	5113-2037482	20kΩA, Line Level
	MISCELLANEOUS	
P153	4443-030171	Connector, 3-Pin

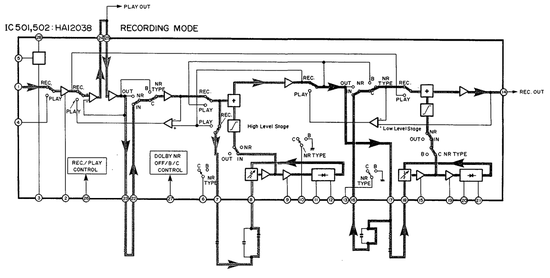
Ref. No.	Part No.	Description
	PCB-9 KEY SWITCHES P. C. BOARD	
	DIODES	
D841	5637-TLR226	L.E.D., TLR226, Red, Record
D842, 843, 844	5637-TLG226	L.E.D., TLG226, Green, Rew., Play, F.FWD
D845	5637-TLY226	L.E.D., TLY226, Yellow, Pause
	MISCELLANEOUS	
SW801, 802, 803, 804, 805 806	4431-01017193	Push Switch, Record, Rew., Play, F.FWD, Stop, Pause
	PCB-10 DOLBY NR AND HX-PRO INDICATORS P. C. BOARD	
	DIODES	
D433	5637-GL9NG2	L.E.D., GL9NG2, Green, Dolby NR B
D434	5637-GL9HY2	L.E.D., GL9HY2, Yellow, Dolby NR C
D435	5637-GL9PR20	L.E.D., GL9PR20, Red, HX-PRO
	PCB-11 RECORD CAL. CONTROL P.C. BOARD	
	CONTROLS	
VR201, 202	5101-1027274	22kΩB, Record Cal.
	PCB-12 AUTO REPEAT P. C. BOARD	
SW474	4431-01027294	Push Switch, Auto Repeat
	PCB-13 INPUT AND OUTPUT JACKS P. C. BOARD	
J1, 2, 3, 4, 5, 6	4486-8	6-Pin Jack, Input (Low, High), Output
P181, 182	4443-030171	Connector, 3-Pin
	PCB-14 POWER SWITCH P.C. BOARD	
C1	5361-1030419	Capacitor, 0.01μF, +100% −0%, AC125V, Ceramic
SW1	4431-A01026	Push Switch, Power
	PCB-15 LAMP P. C. BOARD	
PL1	5731-1507245	Lamp, Clear
	PCB-16 E.A.S. INDICATOR P.C. BOARD	
D853	5637-TLG206	L.E.D., TLG206, Green, Electronic Auto Search
	PCB-17 POWER INDICATOR P.C. BOARD	
D854	5637-GL9PR20	L.E.D., GL9PR20, Red, Power
	PCB-18 REMOTE CONTROL SOCKET P.C. BOARD	
SO1	4474-159	DIN Jack
	PCB-19 TORQUE CONTROL P.C. BOARD	
Q891	5613-2320(E)or(F)	Transistor, 2SC2320(E) or 2SC2320(F)
	PCB-20 MECHA. TERMINAL P.C. BOARD	
	CAPACITORS	
C901	5342-226C0951	22μF, ±20%, 16V, Electrolytic
C903	5345-107-16	100μF, +50% −10%, 16V, Electrolytic
	DIODES	
D901, 902	5632-1SR35-10	1SR35-100
	MISCELLANEOUS	
SW901, 902	4463-48	Spring Switch, Erase Protect, Cassette Det.
	PCB-21 ROTATION SENSOR P.C. BOARD	
PH901	5624-GP2S02(A)or(B)	Photo-Interrupter

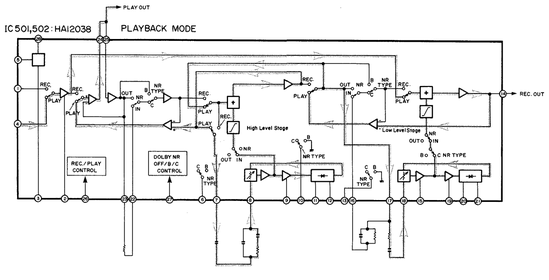
PACKAGE

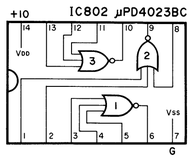

Owner's Guide
1111-J30105
1111-J30106 (for Canadian model only)
Soft Sheet
Important Safeguards Guide
1111-J90195
Connection Cord (x2)
4161-7185
Polyethylene Bag
1241-C149
Soft Sheet
1223-11729
Cushion (x2)
1222-7184
Carton box
1221-817130

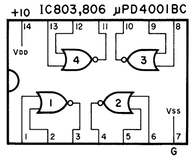
SCHEMATIC DIAGRAM

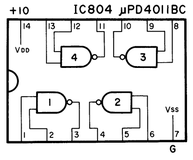


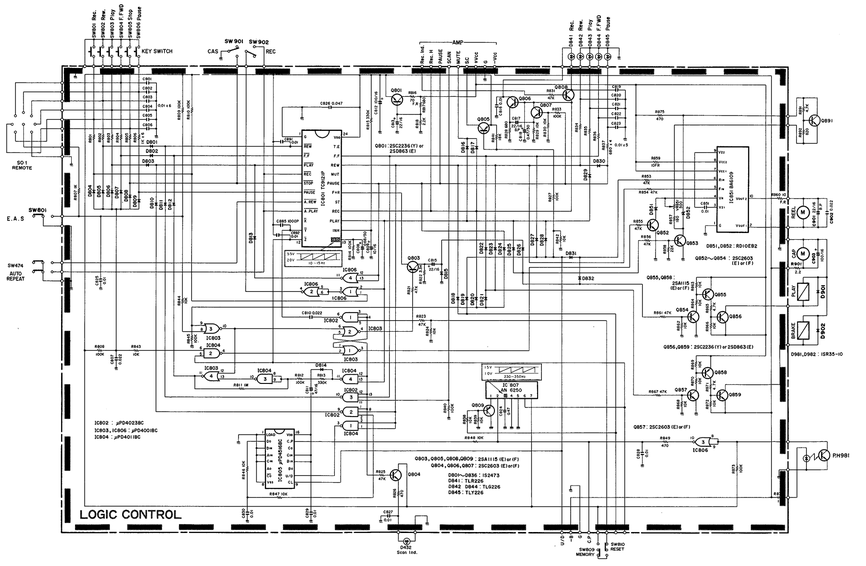












RECORDING SIGNAL (Lch)
PLAYBACK SIGNAL (Rch)
HX-PRO SIGNAL

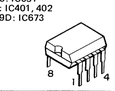
1. ALL RESISTANCES VALUES ARE IN Ω.
   kΩ = 1000Ω, MΩ = 1000 kΩ
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P = μμF
4. V: DC VOLTAGE AT NO SIGNAL
   . . . V STOP MODE
   [. . . V] PLAYBACK MODE
   (. . . V) RECORDING MODE
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS

μPC 4558C: IC201, 471
NJM 4556: IC351
LA 6458 : IC401, 402
NJM 4559D: IC673

μPD 4023C: IC802
μPD 4001C: IC803, 806
μPD 4011C: IC804

μPD 4516C: IC805



HA 17082PS: IC671, 672

HA 12038: IC501, 502

TC 9121P: IC801

AN 6250: IC807

BA 6109: IC851

BA 335: IC951

2SB 855 (C): Q1
2SC 1419 (C): Q3

2SC 2236 (Y): Q5, 801, 856, 859
2SD 667 (C): Q251, 671, 672
2SB 647 (C): Q717

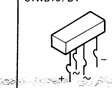
2SK 170 (GR): Q301, 302
2SJ 74 (GR): Q303, 304
2SK 163 (M): Q673, 674

2SC 2603 (F): Q2, 501 ~ 506, 581, 582, 675, 676, 705, 706, 708, 710, 716
2SA 1115 (F): Q4, 707
2SA 1115 (F) or (E): Q51, 751, 759
2SC 2603 (F) or (E): Q52, 109, 110, 252, 351, 753, 754, 951
2SA 1115 (E) or (F): Q803, 805, 808, 809, 855, 858
2SC 2603 (E) or (F): Q804, 806, 807 852 ~ 854, 857

2SA 1190 (E): Q101, 102
2SC 2855 (E) or (D): Q103, 104
2SC 2320L (F): Q105, 106, 151, 152
2SA 999 (F): Q107, 108
2SA 999L (F): Q153, 154, 507, 508
2SA 984 (F): Q305, 306
2SC 2274 (F): Q307, 308
2SC 2320 (D) or (E): Q421 ~ 424
2SC 1845 (E): Q701 ~ 704
2SC 2878 (B): Q755 ~ 758

1S2473: D2, 5, 51 ~ 56, 251 ~ 254, 421, 422, 671 ~ 675, 701 ~ 703, 751 ~ 757, 801 ~ 832, 951 ~ 953
RD9.1EB2: D3, 4
RD5.1EB2: D471 ~ 474
HZ12AL: D581, 582
RD4.7EB2: D583
RD6.8EB2: D759
RD10EB2: D851, 852

S1WB10: D1



MV11: D101, 102

1K34A: D401, 402

TLG 206: D853

GL 9NG2: D433
GL 9HY2: D434
GL 9PR20: D435, 854

TLR 226: D841
TLG 226: D842 ~ 844
TLY 226: D845

IC501, 502: HA12038

Pin No. / DOLBY NR	1	2	3	4	5	6	7	8	9	10	11	12	13	14
OFF	7.1	7.1	0	7.1	7.1	7.1	7.3	7.1	7.1	0	0.96	0.9	0	6.4
TYPE B	7.3	7.3	0	7.3	7.5	7.3	7.5	6.1	7.2	0	0.96	0.9	0	6.5
TYPE C	6.8	6.8	0	6.8	6.8	6.8	7.0	6.6	6.7	0	1	1	0.9	6.0

15	16	17	18	19	20	21	22	23	24	25	26	27	28
7.6	7.0	7.0	7.1	7.2	1.0	1	7.3	7.3	7.3	7.3	0	5.3	13.6
7.8	7.2	7.2	7.3	7.36	1.0	1	7.6	7.6	7.6	7.6	0	7.3	13.6
7.3	6.7	6.7	6.7	6.85	1.0	1	7.0	7.0	7.0	7.1	0	8.7	13.6

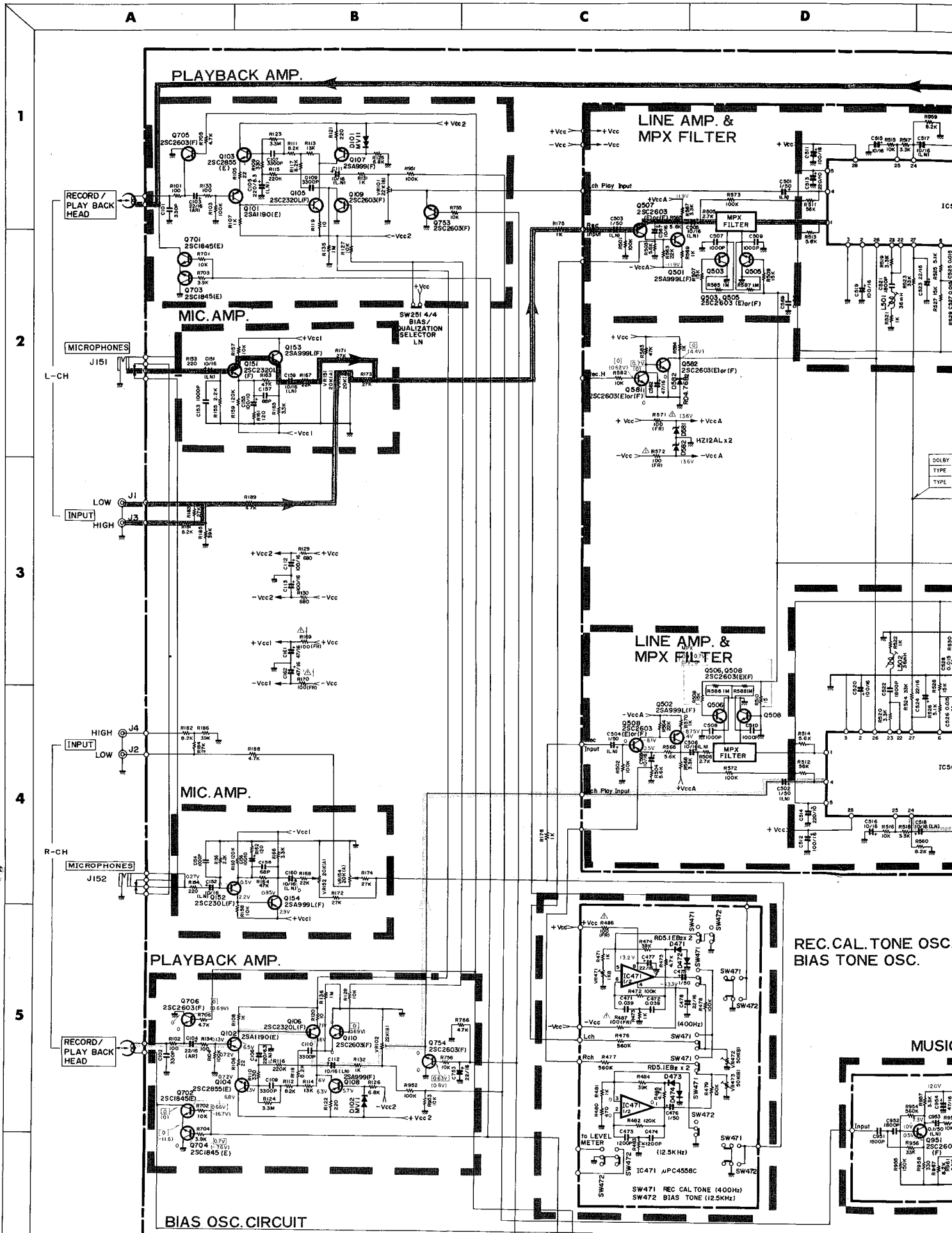
IC671, 672: HA17082PS

Pin No. / HX-PRO	1	2	3	4	5	6	7	8
OFF	0	0	0	−13	0	0	−0.3	+12.9
ON	0	0	0	−13.5	0	0	0	+13.4

IC673: NJM4559

Pin No. / HX-PRO	1	2	3	4	5	6	7	8
OFF	+11.6	0	0	−13	0	0	+11.6	+12.9
ON	−12.2	0	0	−13.5	0	0	−12.2	+13.4

SCHEMATIC DIAGRAM



LEVEL DISPLAY

DOLBY NR SECTION

IC501 HAI2038

LINE AMP.

RECORDING AMP.

BIAS/EQUALIZATION SELECTOR

IC502 HAI2038

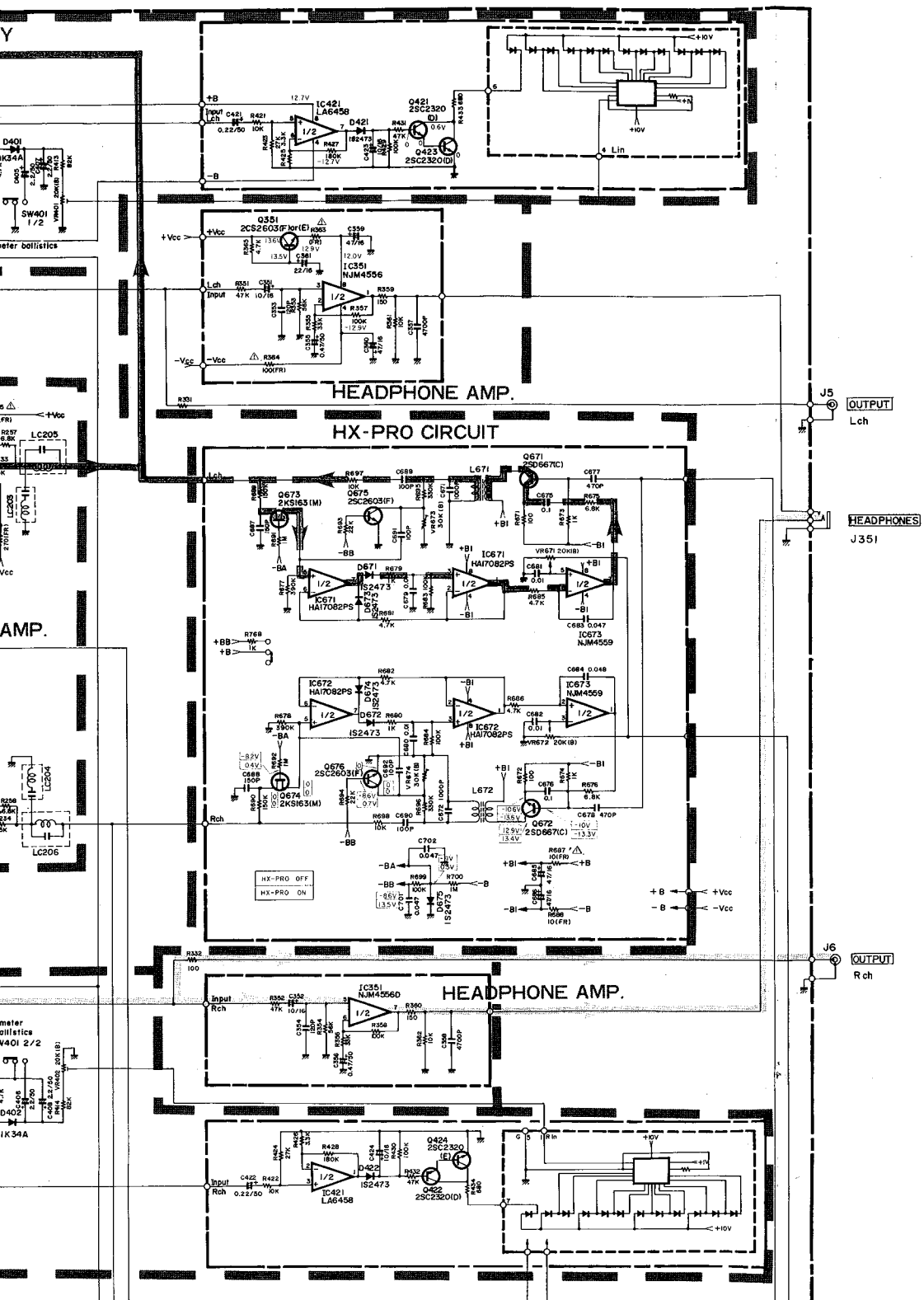
DOLBY NR SECTION

LINE AMP.

LEVEL DISPLAY

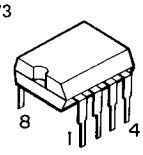
ONE OSC.
OSC.

MUSIC SENSE CIRCUIT

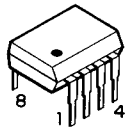


PIN CONNECTION DIAGRAM OF

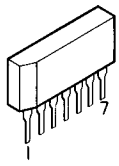
μPC 4558C: IC201, 471
NJM 4556: IC351
LA 6458 : IC401, 402
NJM 4559D: IC673



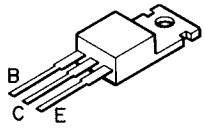
HA 17082PS: IC671, 672



AN 6250: IC807



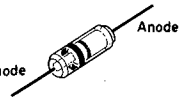
2SB 855 (C): Q1
2SC 1419 (C): Q3



2SC 2603 (F): Q2, 501 ~ 506, 581, 582, 675, 676, 705, 706, 708,
2SA 1115 (F): Q4, 707
2SA 1115 (F) or (E): Q51, 751, 759
2SC 2603 (F) or (E): Q52, 109, 110, 252, 753, 754, 951
2SA 1115 (E) or (F): Q803, 805, 808, 809, 855, 858
2SC 2603 (E) or (F): Q804, 806, 807 B
852 ~ 854, 857 C E

1S2473: D2, 5, 51 ~ 56, 251 ~ 254, 421, 422, 671 ~ 675, 701 ~ 703, 751 ~ 757, 801 ~ 832, 951 ~ 953
RD9.1EB2: D3, 4
RD5.1EB2: D471 ~ 474
HZ12AL: D581, 582
RD4.7EB2: D583
RD6.8EB2: D759
RD10EB2: D851, 852

1K34A: D401, 402

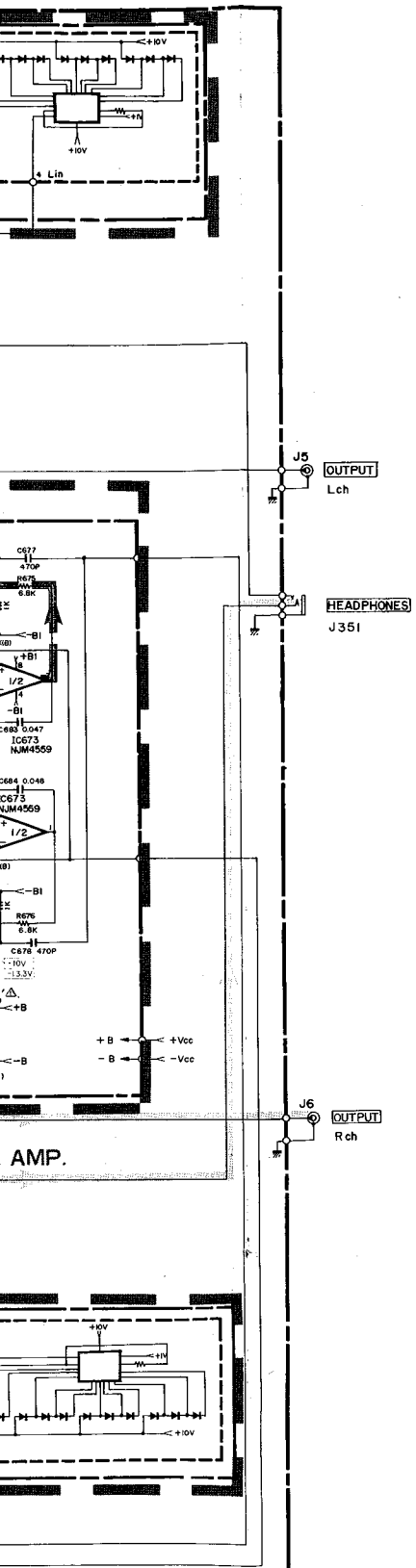


TLG 206: D

IC501, 502: HA12038

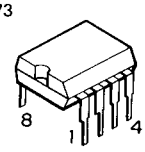
Pin No. / DOLBY NR	1	2	3	4
OFF	7.1	7.1	0	7.1
TYPE B	7.3	7.3	0	7.3
TYPE C	6.8	6.8	0	6.8

K	L	M	N

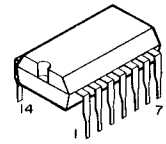


PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS

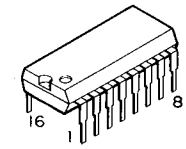
μPC 4558C: IC201, 471
NJM 4556: IC351
LA 6458 : IC401, 402
NJM 4559D: IC673



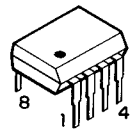
μPD 4023C: IC802
μPD 4001C: IC803, 806
μPD 4011C: IC804



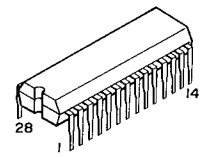
μPD 4516C: IC805



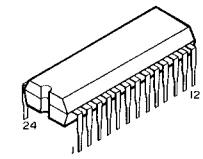
HA 17082PS: IC671, 672



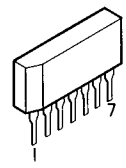
HA 12038: IC501, 502



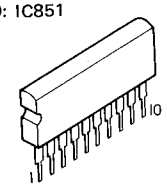
TC 9121P: IC801



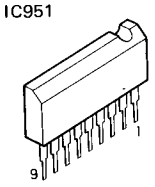
AN 6250: IC807



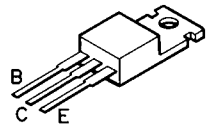
BA 6109: IC851



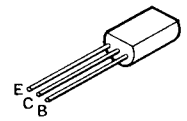
BA 335: IC951



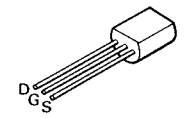
2SB 855 (C): Q1
2SC 1419 (C): Q3



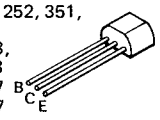
2SC 2236 (Y): Q5, 801, 856, 859
2SD 667 (C): Q251, 671, 672
2SB 647 (C): Q717



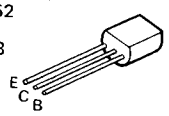
2SK 170 (GR): Q301, 302
2SJ 74 (GR): Q303, 304
2SK 163 (M): Q673, 674



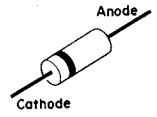
2SC 2603 (F): Q2, 501 ~ 506, 581, 582, 675, 676, 705, 706, 708, 710, 716
2SA 1115 (F): Q4, 707
2SA 1115 (F) or (E): Q51, 751, 759
2SC 2603 (F) or (E): Q52, 109, 110, 252, 351, 753, 754, 951
2SA 1115 (E) or (F): Q803, 805, 808, 809, 855, 858
2SC 2603 (E) or (F): Q804, 806, 807 852 ~ 854, 857



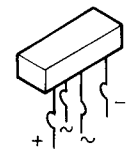
2SA 1190 (E): Q101, 102
2SC 2855 (E) or (D): Q103, 104
2SC 2320L (F): Q105, 106, 151, 152
2SA 999 (F): Q107, 108
2SA 999L (F): Q153, 154, 507, 508
2SA 984 (F): Q305, 306
2SC 2274 (F): Q307, 308
2SC 2320 (D) or (E): Q421 ~ 424
2SC 1845 (E): Q701 ~ 704
2SC 2878 (B): Q755 ~ 758



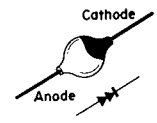
1S2473: D2, 5, 51 ~ 56, 251 ~ 254, 421, 422, 671 ~ 675, 701 ~ 703, 751 ~ 757, 801 ~ 832, 951 ~ 953
RD9.1EB2: D3, 4
RD5.1EB2: D471 ~ 474
HZ12AL: D581, 582
RD4.7EB2: D583
RD6.8EB2: D759
RD10EB2: D851, 852



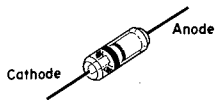
S1WB10: D1



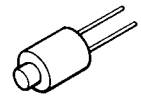
MV11: D101, 102



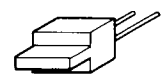
1K34A: D401, 402



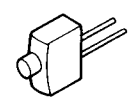
TLG 206: D853



GL 9NG2: D433
GL 9HY2: D434
GL 9PR20: D435, 854

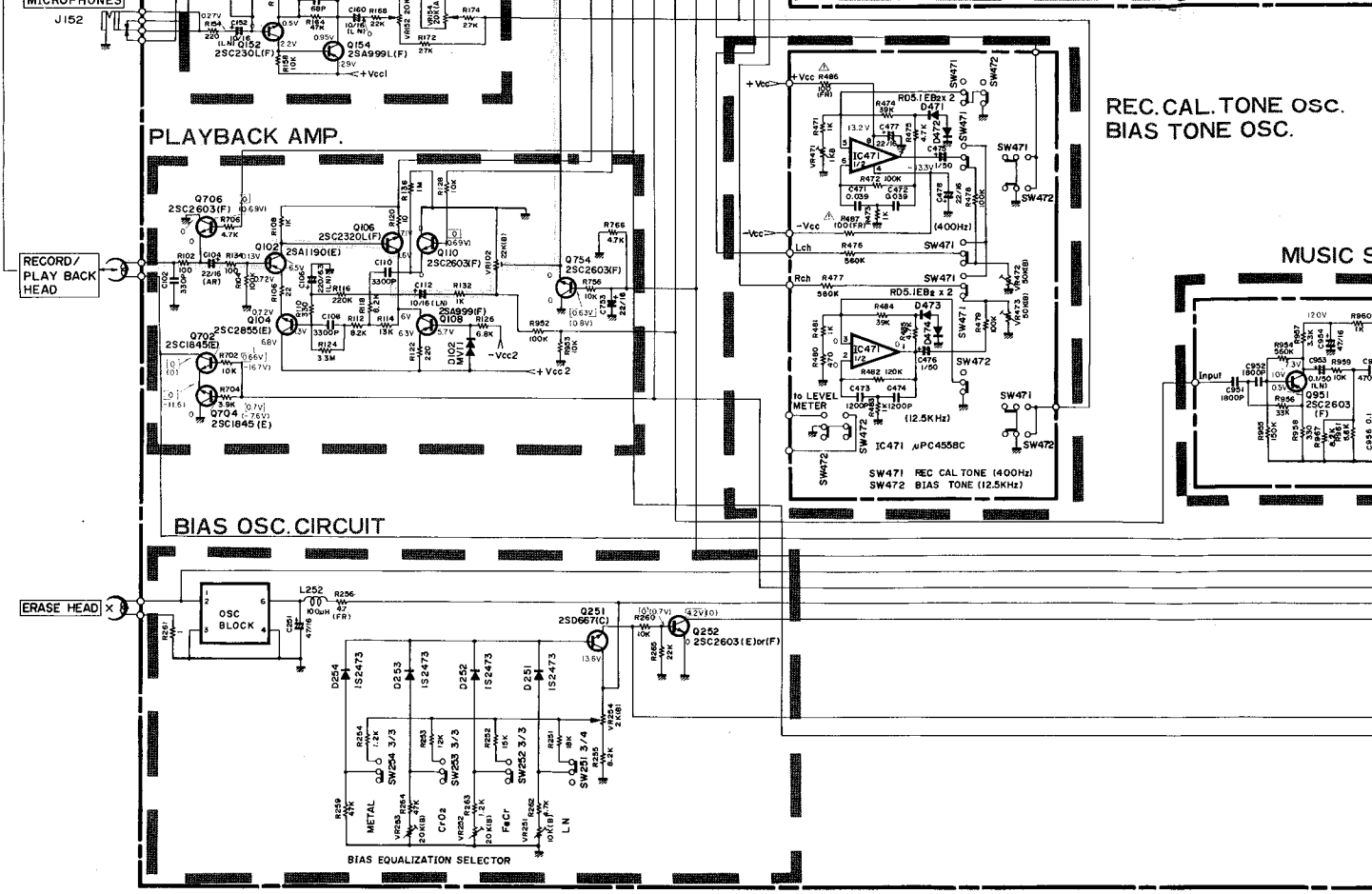


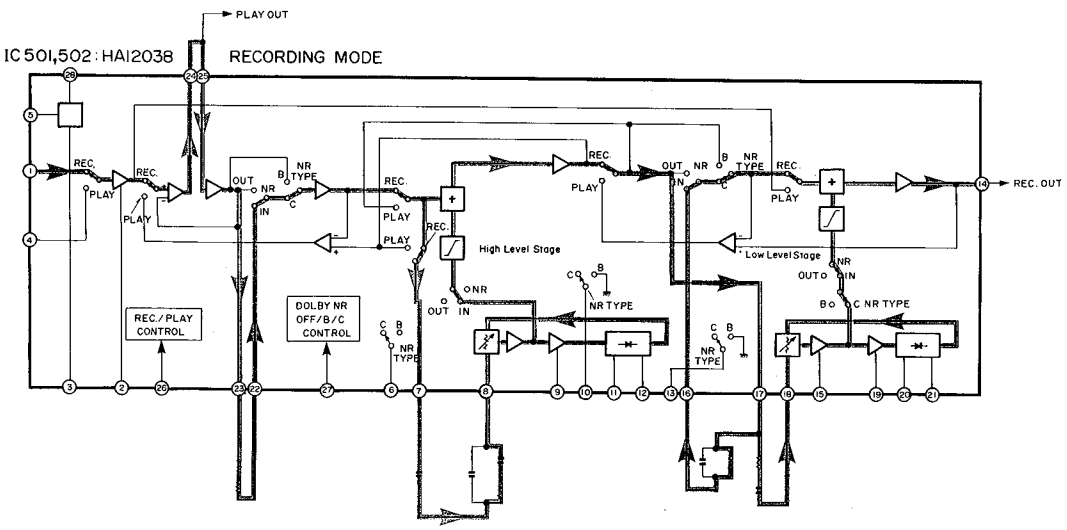
TLR 226: D841
TLG 226: D842 ~ 844
TLY 226: D845

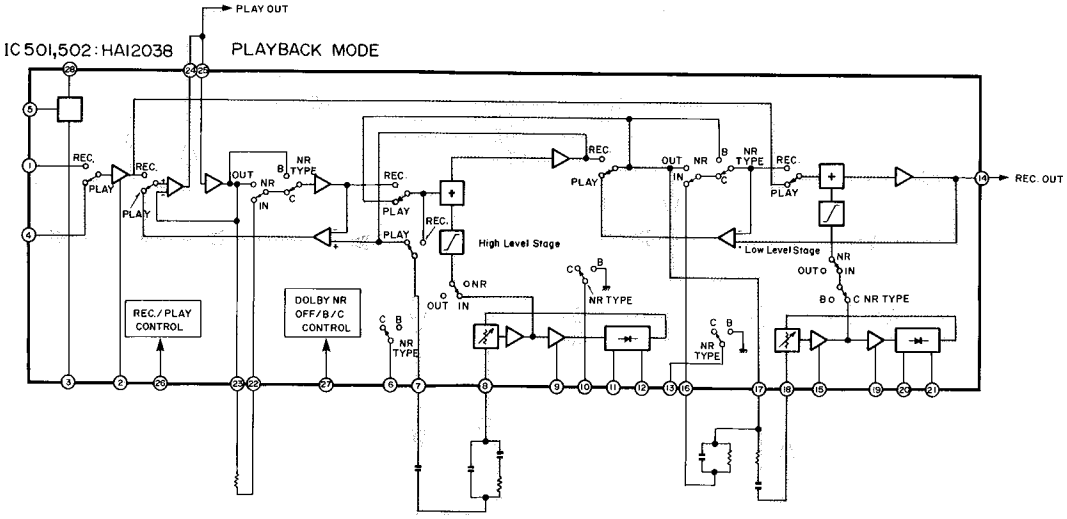


IC501, 502: HA12038

Pin No. / DOLBY NR	1	2	3	4	5	6	7	8	9	10	11	12	13	14
OFF	7.1	7.1	0	7.1	7.1	7.1	7.3	7.1	7.1	0	0.96	0.9	0	6.4
TYPE B	7.3	7.3	0	7.3	7.5	7.3	7.5	6.1	7.2	0	0.96	0.9	0	6.5
TYPE C	6.8	6.8	0	6.8	6.8	6.8	7.0	6.6	6.7	0	1	1	0.9	6.0

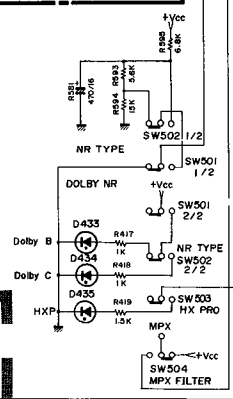

MICROPHONES
J152
PLAYBACK AMP.
RECORD/
PLAY BACK
HEAD
REC. CAL. TONE OSC.
BIAS TONE OSC.
MUSIC S
BIAS OSC. CIRCUIT
ERASE HEAD
OSC
BLOCK
BIAS EQUALIZATION SELECTOR
METAL
CrO2
FeCr
LN
SW471 REC CAL TONE (400Hz)
SW472 BIAS TONE (12.5KHz)
IC471 μPC4558C
to LEVEL
METER
+Vcc
-Vcc
+Vcc2
-Vcc2

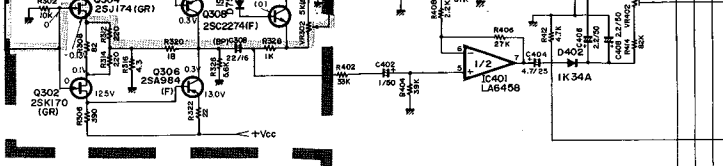

IC501,502 : HAI2038
RECORDING MODE
PLAY OUT
REC. OUT
High Level Stage
Low Level Stage
REC./PLAY
CONTROL
DOLBY NR
OFF/B/C
CONTROL
NR TYPE


IC501,502 : HAI2038
PLAYBACK MODE
PLAY OUT
REC. OUT
High Level Stage
Low Level Stage
REC./PLAY
CONTROL
DOLBY NR
OFF/B/C
CONTROL
NR TYPE

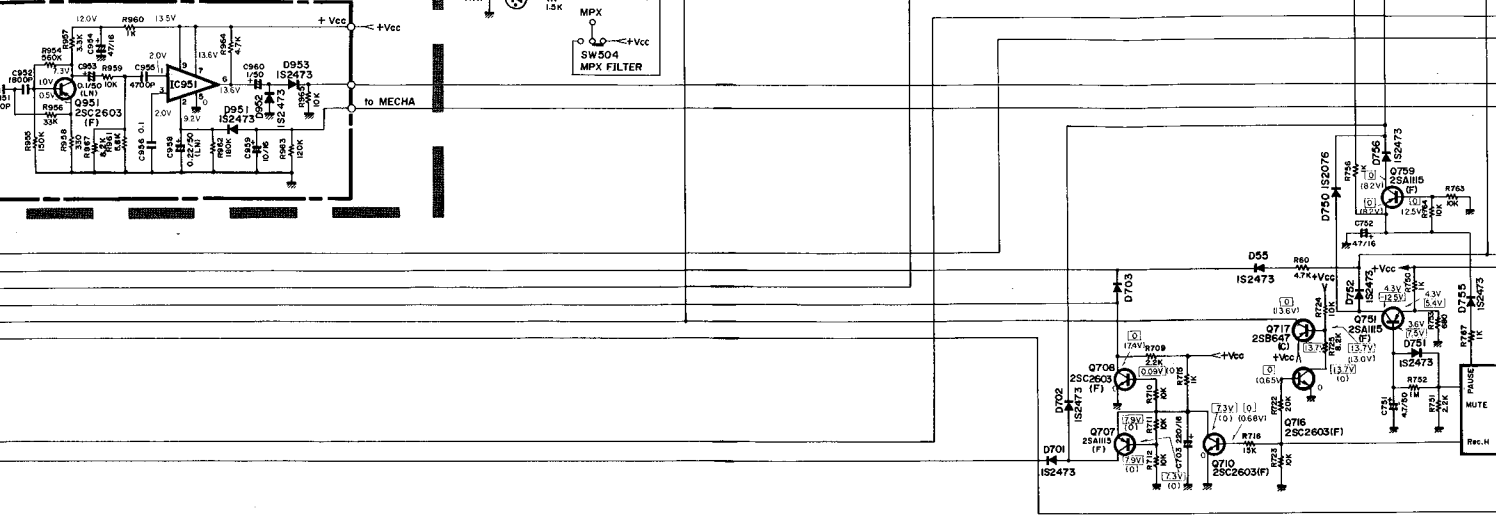
ONE OSC.
OSC.

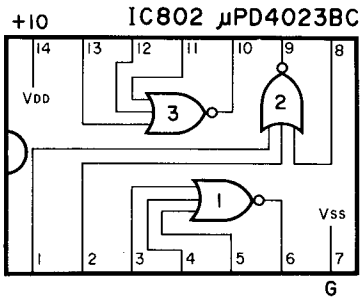
MUSIC SENSE CIRCUIT

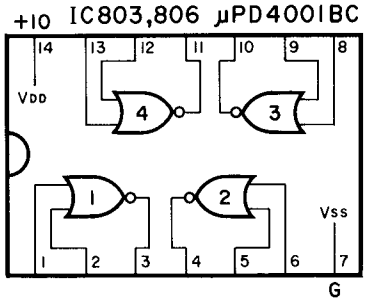


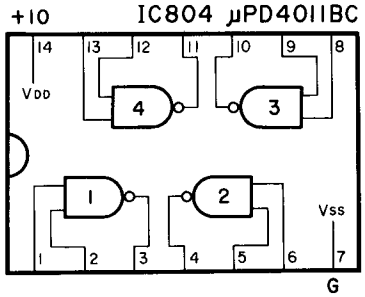


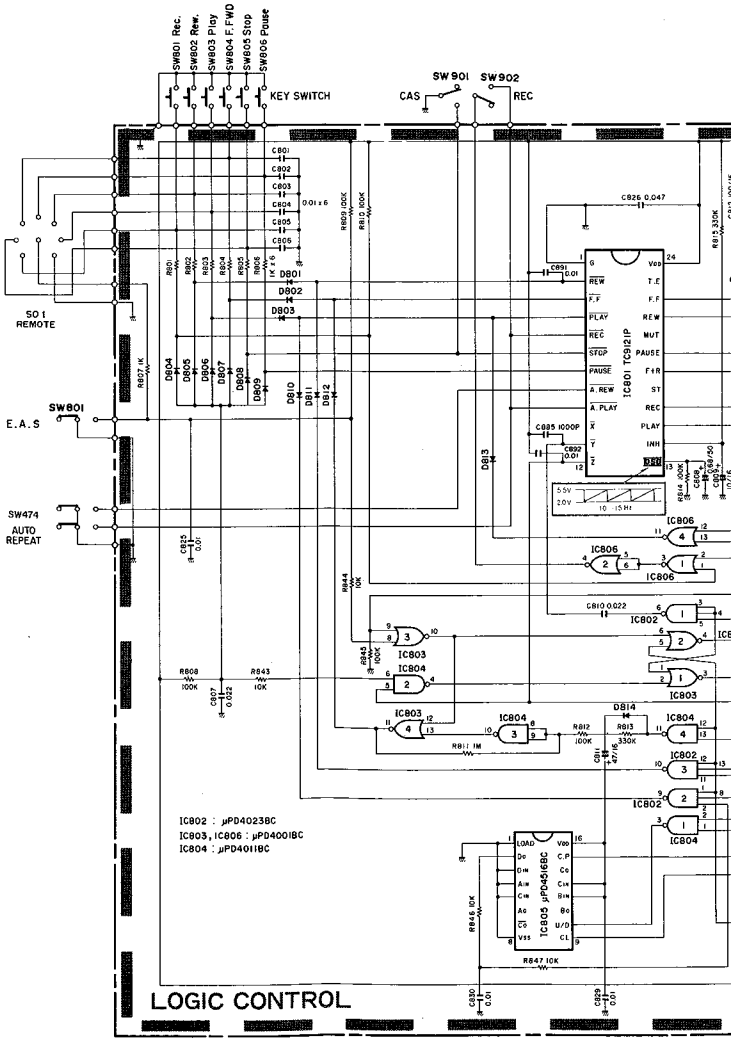
LEVEL DISPLAY

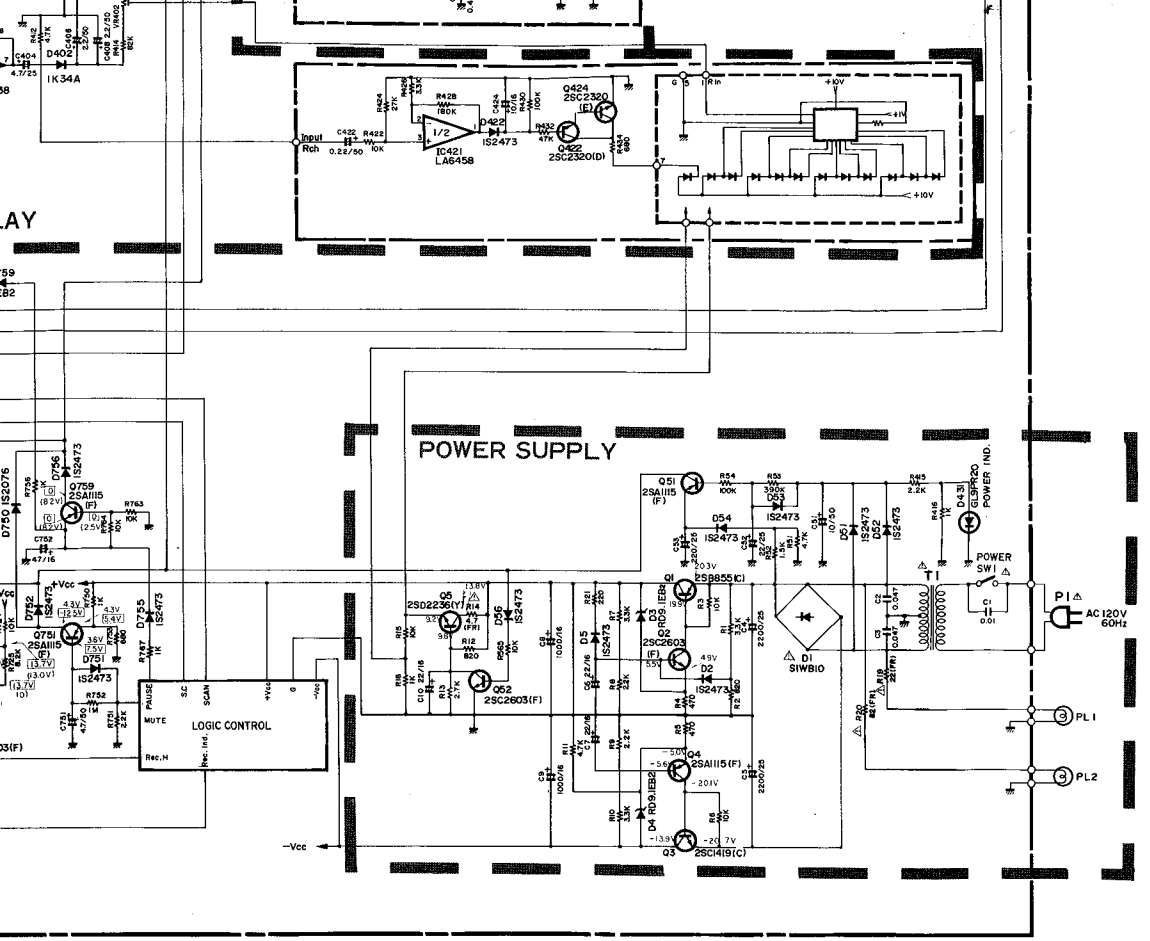


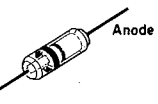










1K34A: D401, 402	TLG 20
	

IC501, 502: HA12038

Pin No. / DOLBY NR	1	2	3
OFF	7.1	7.1	0
TYPE B	7.3	7.3	0
TYPE C	6.8	6.8	0

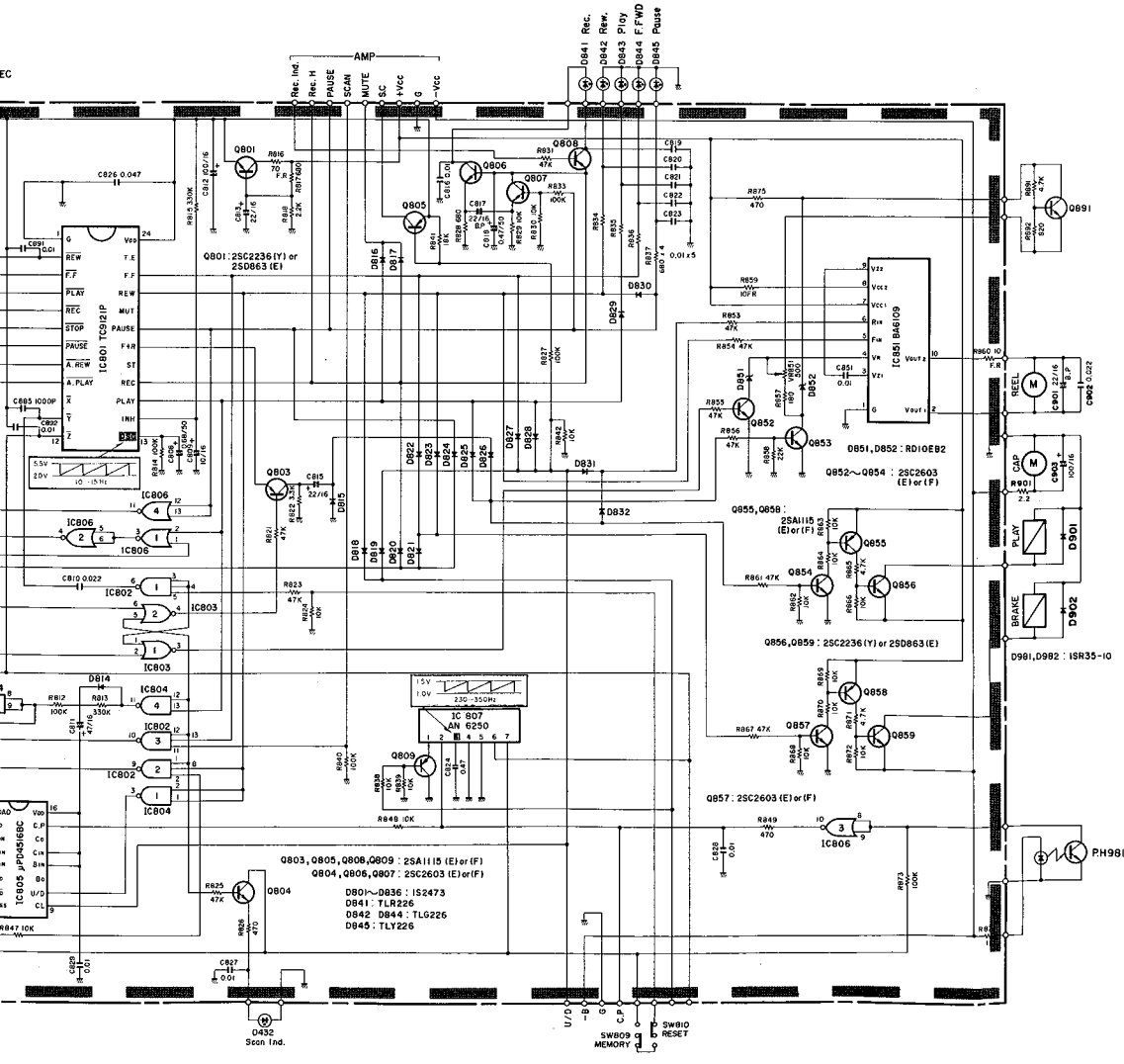
15	16	17
7.6	7.0	7.0
7.8	7.2	7.2
7.3	6.7	6.7

IC671, 672: HA17082PS

Pin No. / HX-PRO	1	2
OFF	0	0
ON	0	0

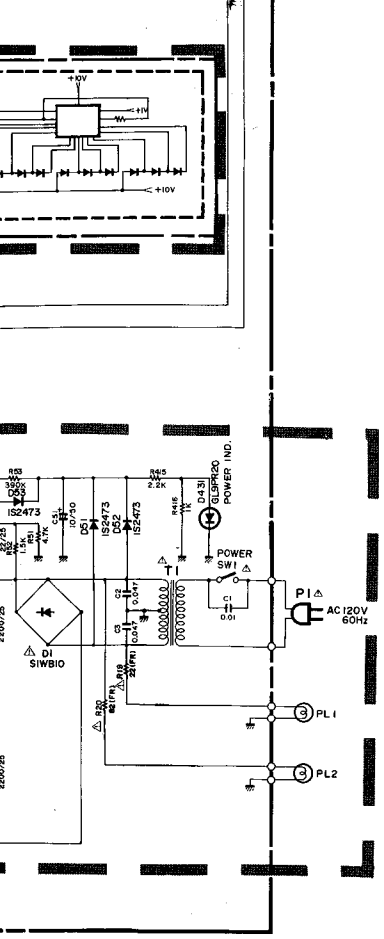
IC673: NJM4559

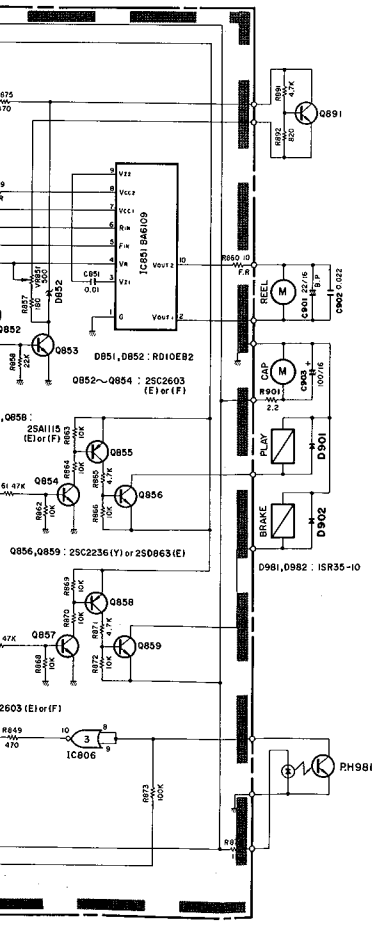
Pin No. / HX-PRO	1	2
OFF	+11.6	0
ON	−12.2	0



..... REC
..... PLA
..... HX-P

1. ALL RESISTANCES VALUE
kΩ = 1000Ω, MΩ = 1000 k
2. THE WATTAGE OF RESIST
3. ALL CAPACITANCES VAL
4. V: DC VOLTAGE AT NO SI
. . . V STOP MODE
. . . V PLAYBACK MODE
(. . . V) RECORDING MO
5. ⚠ SAFETY-REQUIRE
REGULATIONS. THESE CO





1K34A: D401, 402 Cathode Anode	TLG 206: D853	GL 9NG2: D433 GL 9HY2: D434 GL 9PR20: D435, 854	TLR 226: D841 TLG 226: D842 ~ 844 TLY 226: D845

IC501, 502: HA12038

Pin No. / DOLBY NR	1	2	3	4	5	6	7	8	9	10	11	12	13	14
OFF	7.1	7.1	0	7.1	7.1	7.1	7.3	7.1	7.1	0	0.96	0.9	0	6.4
TYPE B	7.3	7.3	0	7.3	7.5	7.3	7.5	6.1	7.2	0	0.96	0.9	0	6.5
TYPE C	6.8	6.8	0	6.8	6.8	6.8	7.0	6.6	6.7	0	1	1	0.9	6.0

15	16	17	18	19	20	21	22	23	24	25	26	27	28
7.6	7.0	7.0	7.1	7.2	1.0	1	7.3	7.3	7.3	7.3	0	5.3	13.6
7.8	7.2	7.2	7.3	7.36	1.0	1	7.6	7.6	7.6	7.6	0	7.3	13.6
7.3	6.7	6.7	6.7	6.85	1.0	1	7.0	7.0	7.0	7.1	0	8.7	13.6

IC671, 672: HA17082PS

Pin No. / HX-PRO	1	2	3	4	5	6	7	8
OFF	0	0	0	−13	0	0	−0.3	+12.9
ON	0	0	0	−13.5	0	0	0	+13.4

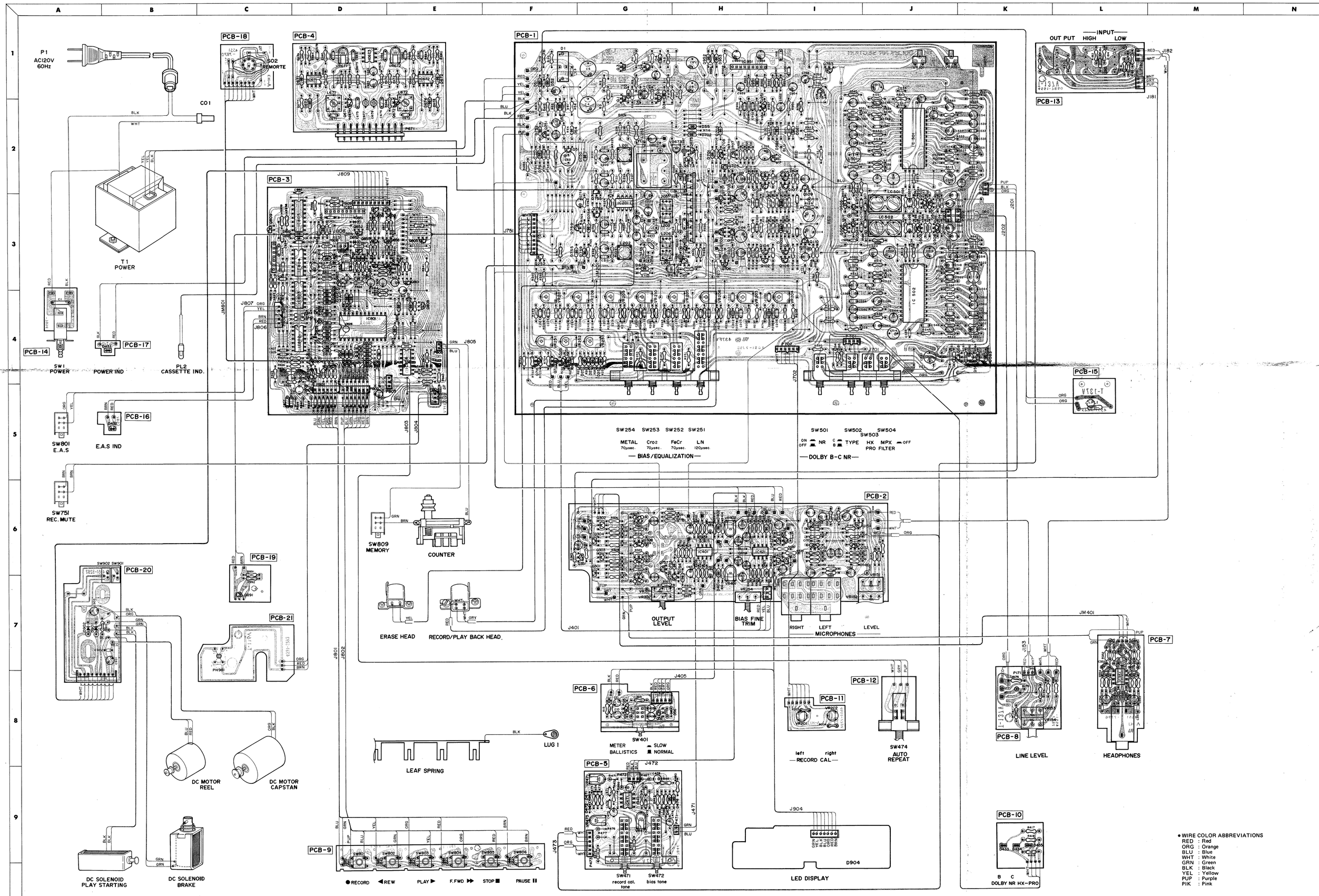
IC673: NJM4559

Pin No. / HX-PRO	1	2	3	4	5	6	7	8
OFF	+11.6	0	0	−13	0	0	+11.6	+12.9
ON	−12.2	0	0	−13.5	0	0	−12.2	+13.4

..... RECORDING SIGNAL (Lch)
..... PLAYBACK SIGNAL (Rch)
..... HX-PRO SIGNAL

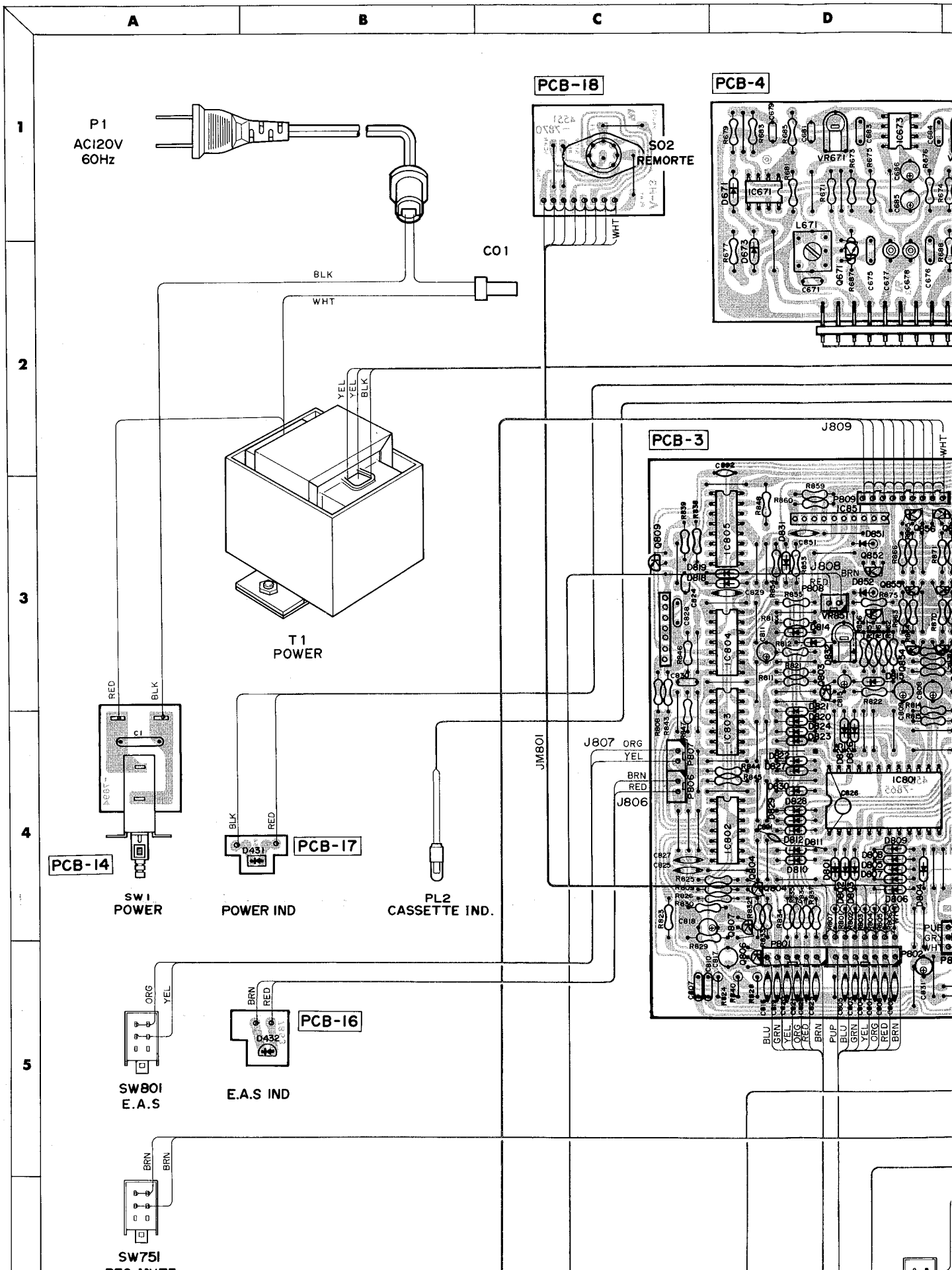
1. ALL RESISTANCES VALUES ARE IN Ω.
   kΩ = 1000Ω, MΩ = 1000 kΩ
2. THE WATTAGE OF RESISTORS IS 1/4W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P = μμF
4. V: DC VOLTAGE AT NO SIGNAL
   ... V STOP MODE
   [...V] PLAYBACK MODE
   (... V) RECORDING MODE
5. ⚠ SAFETY-REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGINAL PARTS.

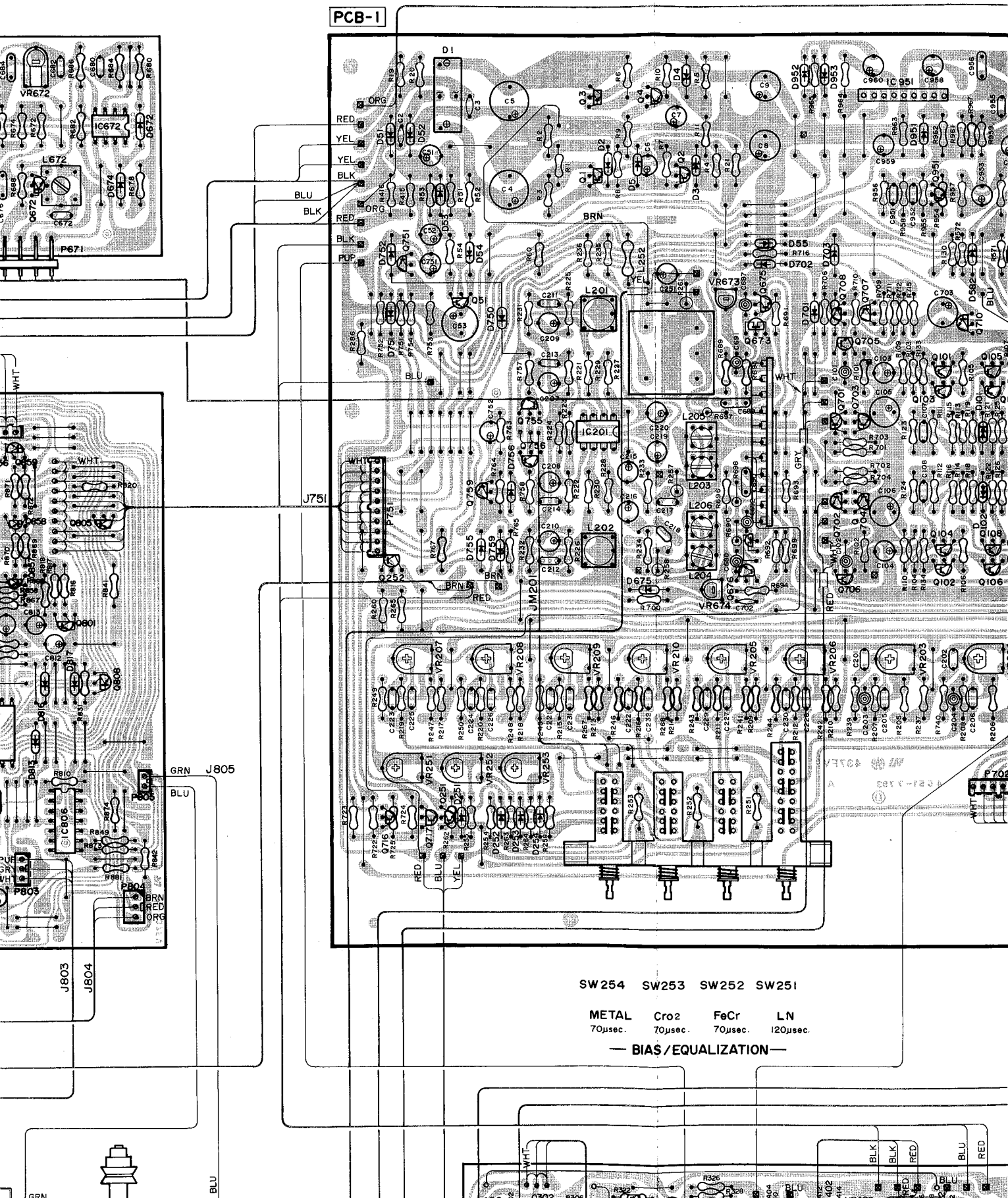
WIRING DIAGRAM

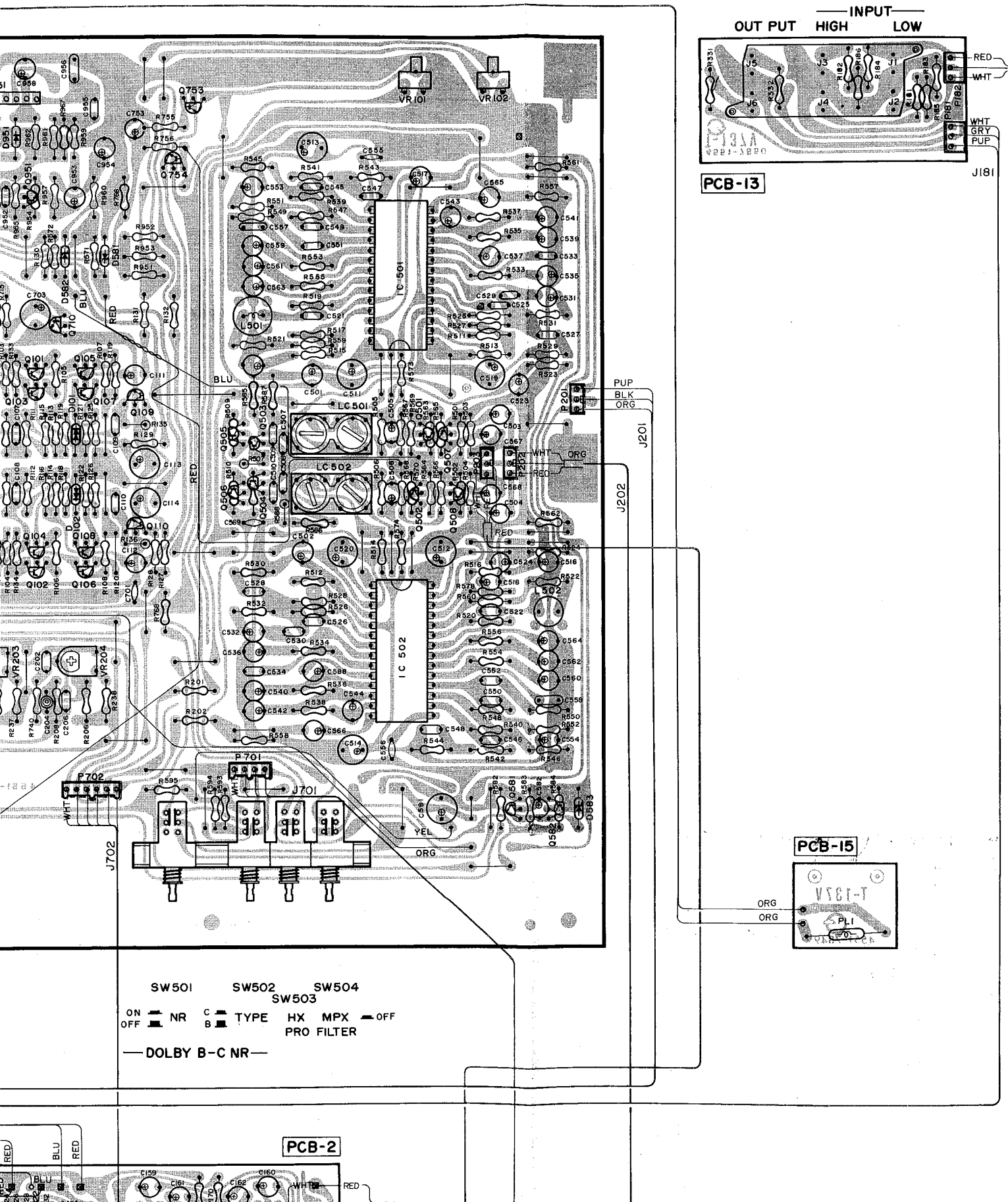


- WIRE COLOR ABBREVIATIONS
  - RED : Red
  - ORG : Orange
  - BLU : Blue
  - WHT : White
  - GRN : Green
  - BLK : Black
  - YEL : Yellow
  - PUP : Purple
  - PIK : Pink

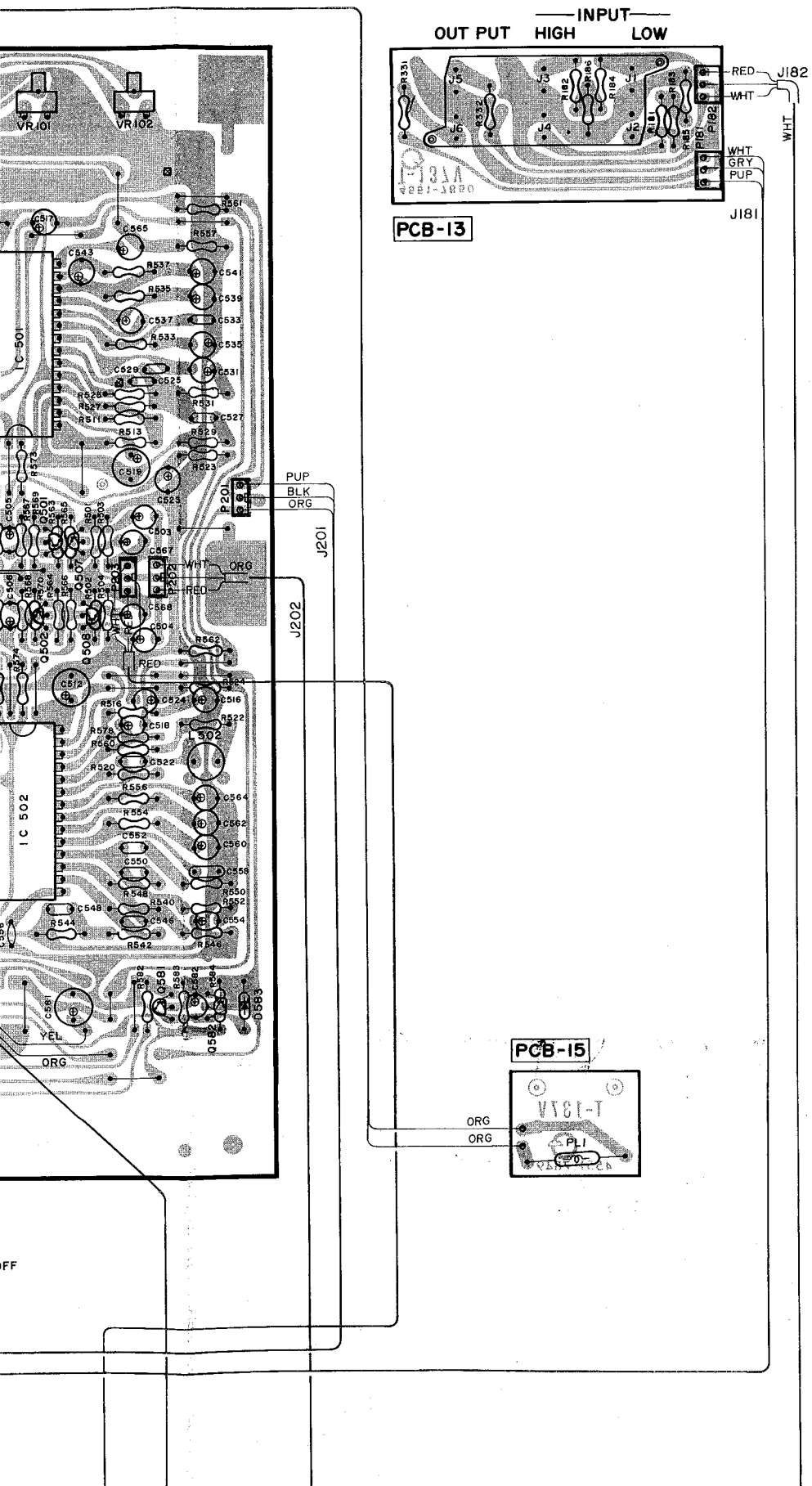
WIRING DIAGRAM

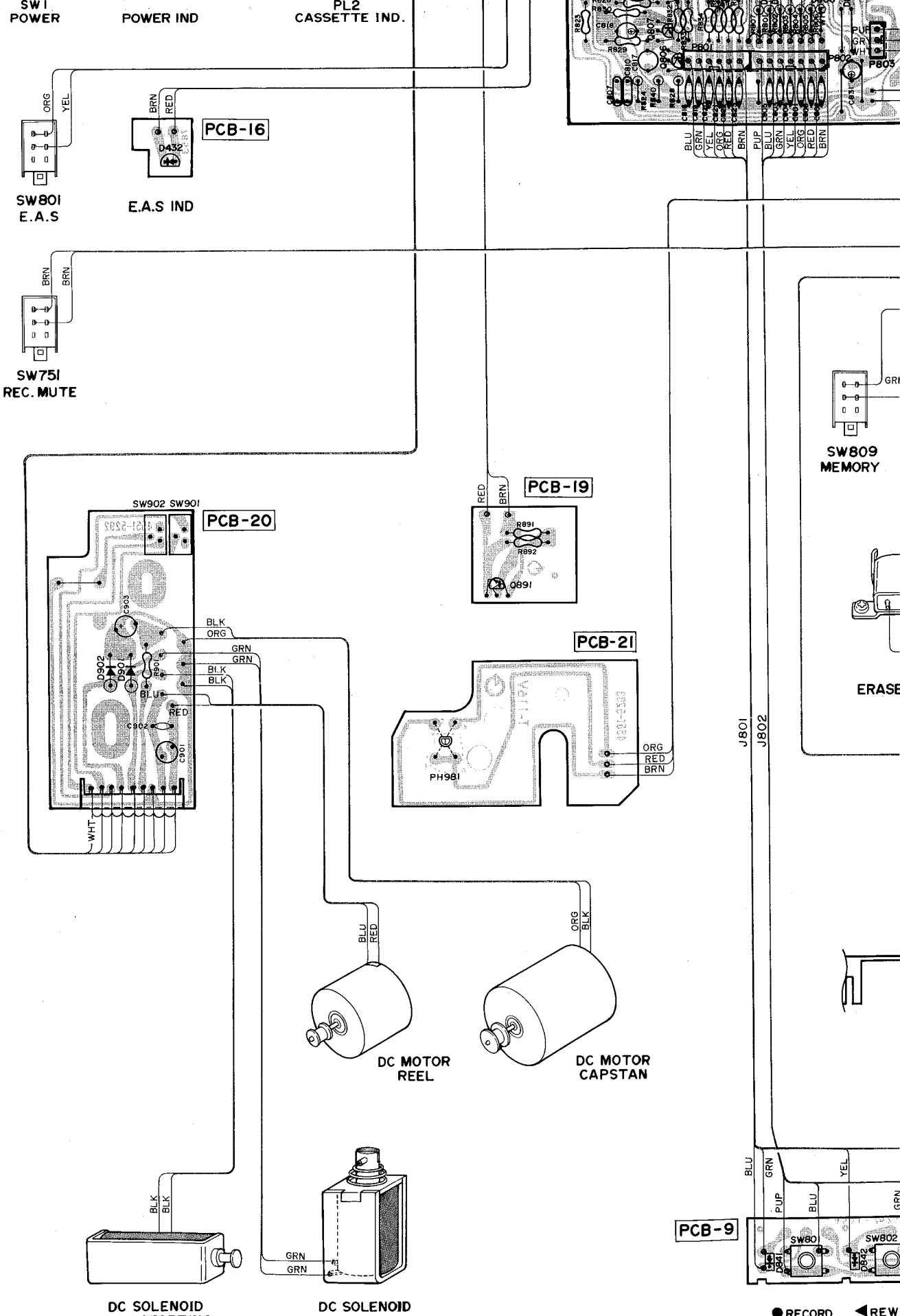


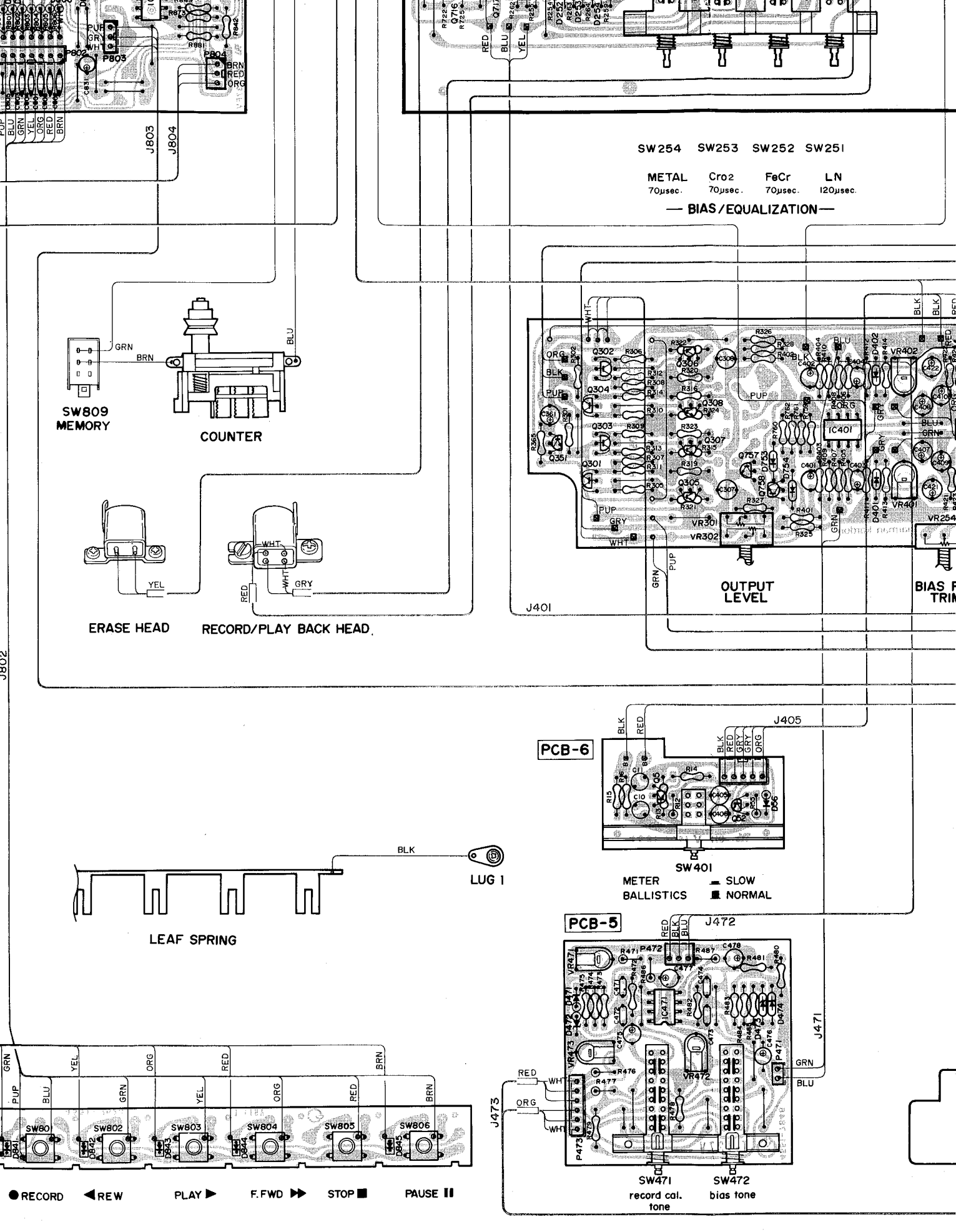

PCB-1
SW254 SW253 SW252 SW251
METAL Cro2 FeCr LN
70μsec. 70μsec. 70μsec. 120μsec.
— BIAS/EQUALIZATION —
J751
J805
J803
J804
P671
P803
P804
P805
P751
P702
IC201
IC672
IC951
L672
L201
L202
L203
L204
L205
L206
VR672
VR673
VR674
VR201
VR202
VR203
VR204
VR205
VR206
VR207
VR208
VR209
VR210
VR251
VR252
VR253
BLU
BLK
RED
YEL
ORG
BRN
GRN
WHT
GRY
PUR

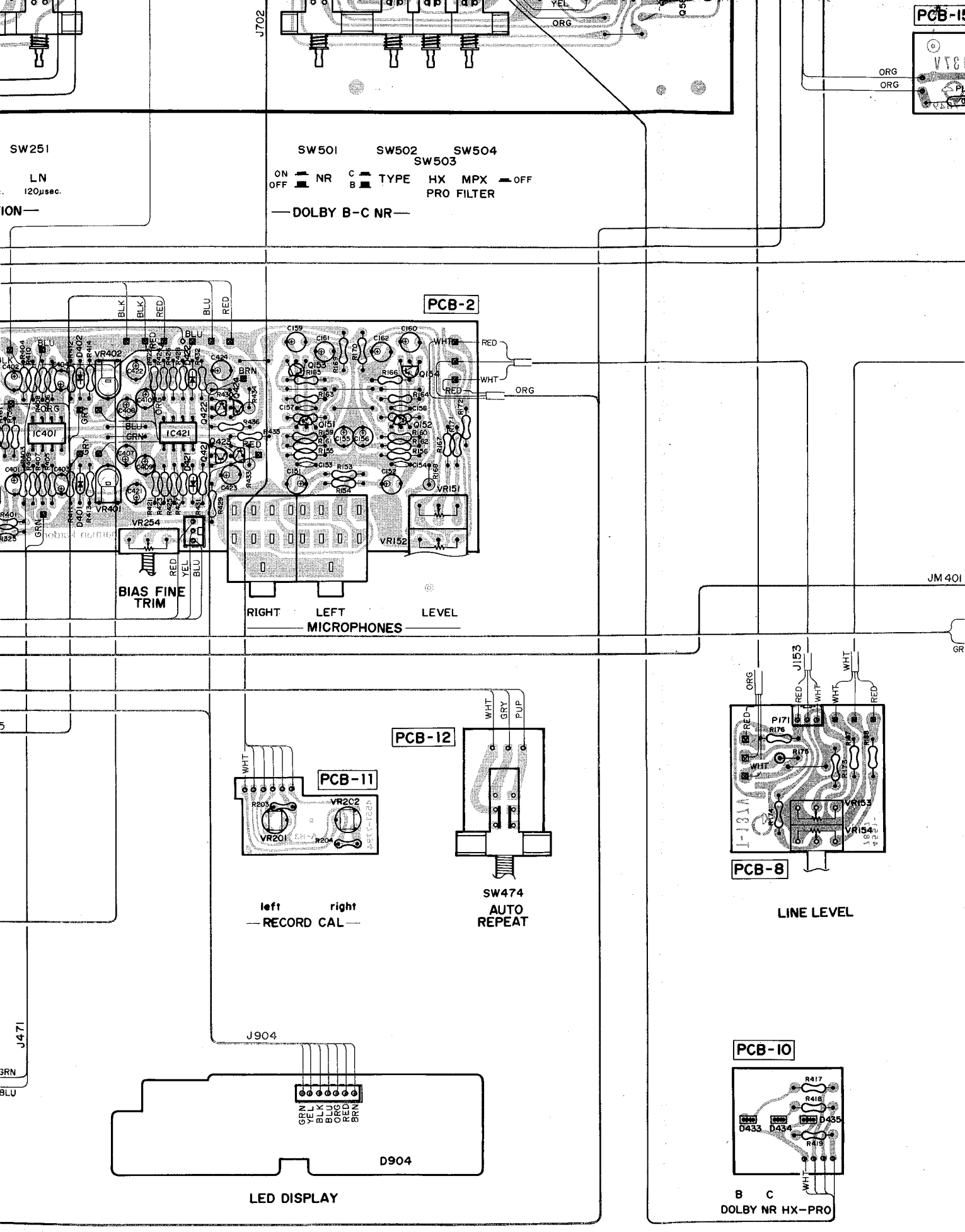

INPUT
OUT PUT HIGH LOW
RED
WHT
WHT
GRY
PUP
J181
PCB-13
PUP
BLK
ORG
J201
WHT
ORG
RED
J202
ORG
ORG
PCB-15
P1
SW501 SW502 SW504
SW503
ON NR C TYPE HX MPX OFF
OFF B PRO FILTER
DOLBY B-C NR
PCB-2
J701
J702
P701
P702
YEL
ORG
WHT
RED
BLU
IC 501
IC 502
LC501
LC502
L501
L502
VR101
VR102
VR203
VR204

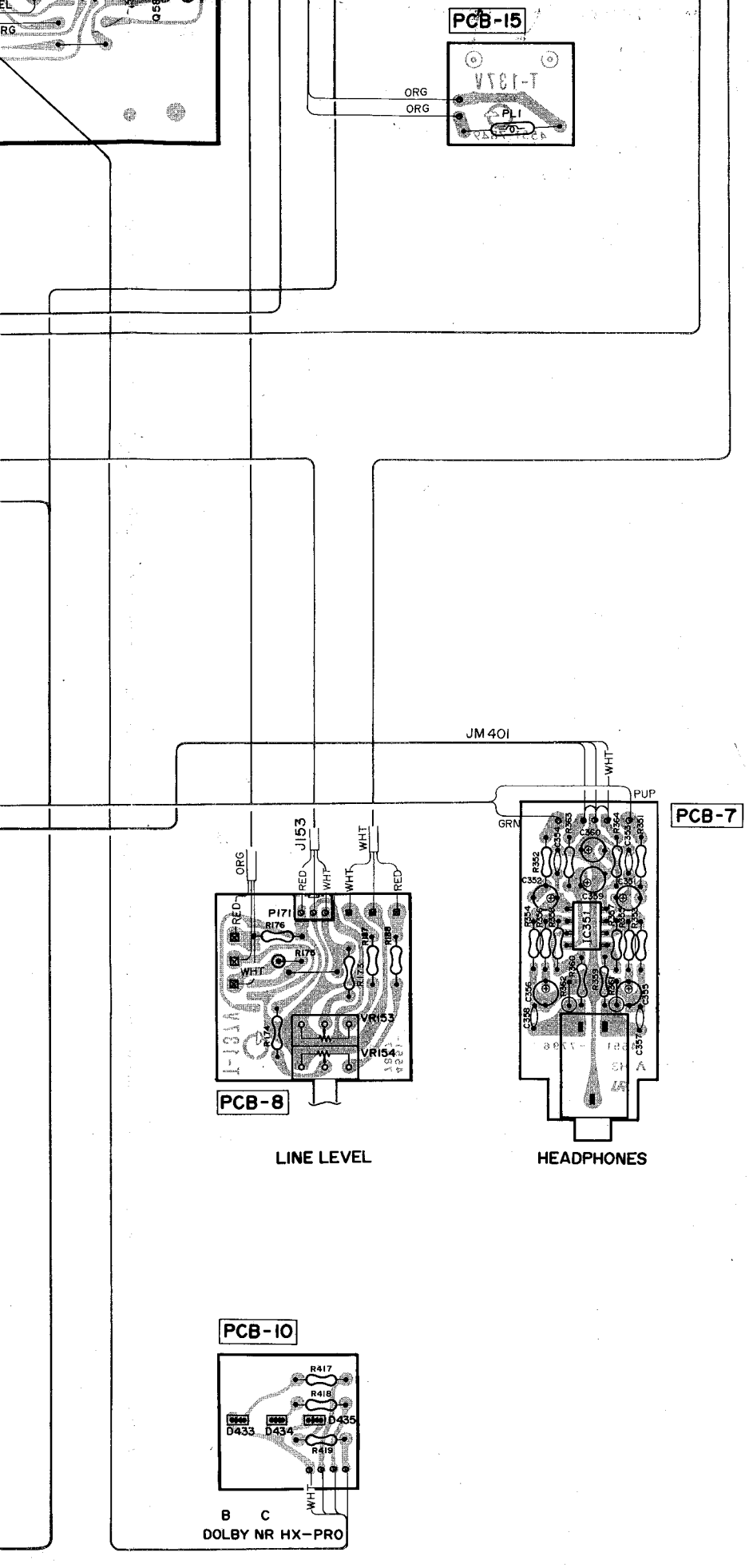
J	K	L	M	N


INPUT
OUT PUT
HIGH
LOW
RED
WHT
J182
WHT
WHT
GRY
PUP
J181
PCB-13
PCB-15
VR101
VR102
IC-501
IC 502
L502
PUP
BLK
ORG
J201
J202
WHT
ORG
RED
RED
YEL
ORG
ORG
ORG
PL1


SW1
POWER
POWER IND
PL2
CASSETTE IND.
SW801
E.A.S
E.A.S IND
PCB-16
D432
SW751
REC. MUTE
SW809
MEMORY
ERASE
PCB-19
R891
R892
Q891
PCB-20
SW902 SW901
C903
D902
D901
C904
C902
C901
WHT
PCB-21
PH981
ORG
RED
BRN
J801
J802
DC MOTOR
REEL
DC MOTOR
CAPSTAN
DC SOLENOID
PLAY STARTING
DC SOLENOID
BRAKE
PCB-9
SW801
SW802
● RECORD
◀ REW


SW254 SW253 SW252 SW251
METAL Cro2 FeCr LN
70μsec. 70μsec. 70μsec. 120μsec.
— BIAS/EQUALIZATION —
SW809
MEMORY
COUNTER
ERASE HEAD
RECORD/PLAY BACK HEAD
OUTPUT
LEVEL
PCB-6
SW401
METER
BALLISTICS
SLOW
NORMAL
LEAF SPRING
LUG 1
PCB-5
SW471
record cal.
tone
SW472
bias tone
SW801
SW802
SW803
SW804
SW805
SW806
RECORD
REW
PLAY
F.FWD
STOP
PAUSE


SW251
LN
120μsec.
ION
SW501
SW502
SW503
SW504
ON
OFF
NR
C
B
TYPE
HX
MPX
OFF
PRO FILTER
DOLBY B-C NR
PCB-2
BIAS FINE TRIM
RIGHT
LEFT
LEVEL
MICROPHONES
JM401
PCB-11
RECORD CAL
left
right
PCB-12
SW474
AUTO REPEAT
J153
PCB-8
LINE LEVEL
J904
D904
LED DISPLAY
PCB-10
B
C
DOLBY NR HX-PRO



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